

SEQUENCE LISTING

<110> Ecopia BioSciences Inc
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Zazopoulos, Emmanuel

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PHARMACEUTICALS

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<151> 2003-08-01

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| ggcgtcaggc | gcggcgactg | cgcaggctcc | tcatacgacc | ccgtggcagc | ggccatgcca | 10680 |
| ccggccagga | ccaggacgtc | accatcgccg | agatggactg | ggcctggctg | cggtagcgcg | 10740 |
| cgctcaccat | ctggggcgtc | ggcagcgtct | tcgccgccgt | cggcaccgcc | taccgcatcc | 10800 |
| tgcacgagat | gaaggtcgac | ccgctcgaac | tgggcgtcgt | caaggacatc | gaggaccgct | 10860 |
| tcggttccgt | acctctgtgg | ttcggcatcc | tcgtcgccgt | cgtgatcacc | gccgtcgtgg | 10920 |
| gcgccgcggt | ctccaccgcc | accttcgtgg | acgcctggac | caactaccgc | ctggagcgtg | 10980 |
| agggggtcgg | catcttccgg | atccgccgcg | gactgctcat | ttcccgtcc | gtcaccatcg | 11040 |
| aggagcgccg | gctgcgcggc | gtcgagctcg | ccgagccgat | gctgctgcgc | tgggcggggc | 11100 |
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| ccgaggaagg | gtccccgacg | gagctgacca | agctcgtccg | gcactcccgt | gccgccctgc | 11280 |
| gccgtcgc | caaccgcggc | ctgctggctc | tcgcggccgt | cgtcgcgggt | ccgctggggc | 11340 |
| tggggctgtg | gctcaccccc | gtcctgggtc | acaccgcctg | gatcacggcg | ctcgtcggcc | 11400 |
| tgccggtcgt | catcgtcctc | gccaacgacg | cctaccgctc | cctcgggccac | ggaatccgcg | 11460 |
| accgctacct | cgtcgtccgc | gccggcacct | tcgcccgccg | tacggtcgcc | gtccagcggg | 11520 |
| acggcgctcat | cggctggaac | atctcccgt | cctacttcca | gcggcgacg | ggactgctca | 11580 |

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<210> 2
 <211> 719
 <212> PRT
 <213> Streptomyces aizunensis

<400> 2

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asp | Asn | Leu | Glu | Leu | Arg | Arg | Glu | Ala | Asp | Ala | Ile | Leu | Ala | Glu | 1 | 5 | 10 | 15 |
| Leu | Val | Gly | Ala | Pro | Gly | Gly | Ser | Ala | Arg | Leu | Arg | Glu | Asp | Gln | Trp | 20 | 25 | 30 | |
| Gln | Ala | Val | Ala | Ala | Leu | Val | Glu | Glu | Arg | Arg | Arg | Ala | Leu | Val | Val | 35 | 40 | 45 | |
| Gln | Arg | Thr | Gly | Trp | Gly | Lys | Ser | Ala | Val | Tyr | Phe | Val | Ala | Thr | Ala | 50 | 55 | 60 | |
| Leu | Leu | Arg | Arg | Arg | Gly | Ser | Gly | Pro | Thr | Val | Ile | Ile | Ser | Pro | Leu | 65 | 70 | 75 | 80 |
| Leu | Ala | Leu | Met | Arg | Asn | Gln | Val | Glu | Ala | Ala | Ala | Arg | Ala | Gly | Ile | 85 | 90 | 95 | |
| Gln | Ala | Arg | Thr | Ile | Asn | Ser | Ala | Asn | Pro | Glu | Glu | Trp | Glu | Thr | Ile | 100 | 105 | 110 | |
| Tyr | Gly | Glu | Val | Glu | Arg | Gly | Glu | Thr | Asp | Val | Leu | Leu | Val | Ser | Pro | 115 | 120 | 125 | |
| Glu | Arg | Leu | Asn | Ser | Val | Asp | Phe | Arg | Asp | Gln | Val | Leu | Pro | Lys | Leu | 130 | 135 | 140 | |
| Ala | Ala | Thr | Thr | Gly | Leu | Leu | Val | Val | Asp | Glu | Ala | His | Cys | Ile | Ser | 145 | 150 | 155 | 160 |
| Asp | Trp | Gly | His | Asp | Phe | Arg | Pro | Asp | Tyr | Arg | Arg | Leu | Arg | Thr | Met | 165 | 170 | 175 | |
| Leu | Ala | Glu | Leu | Pro | Glu | Gly | Val | Pro | Val | Leu | Ala | Thr | Thr | Ala | Thr | 180 | 185 | 190 | |
| Ala | Asn | Ala | Arg | Val | Thr | Ala | Asp | Val | Ala | Glu | Gln | Leu | Gly | Thr | His | 195 | 200 | 205 | |
| Gly | Glu | His | Ala | Leu | Val | Leu | Arg | Gly | Pro | Leu | Asp | Arg | Glu | Ser | Leu | 210 | 215 | 220 | |
| Arg | Leu | Gly | Val | Leu | Gln | Leu | Pro | Asp | Ala | Ala | His | Arg | Leu | Ala | Trp | 225 | 230 | 235 | 240 |

Leu Gly Asp Arg Leu Ala His Leu Pro Gly Ser Gly Ile Ile Tyr Thr
 245 250 255
 Leu Thr Val Ala Ala Ala Glu Glu Val Ala Ala Phe Leu Arg Gln Arg
 260 265 270
 Gly Tyr Pro Val Ala Ser Tyr Thr Gly Lys Thr Glu Asn Ala Asp Arg
 275 280 285
 Leu Gln Ala Glu Glu Asp Leu Leu Ala Asn Arg Val Lys Ala Leu Val
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 Ala Thr Ser Ala Leu Gly Met Gly Phe Asp Lys Pro Asp Leu Gly Phe
 305 310 315 320
 Val Val His Met Gly Ser Pro Ser Ser Pro Ile Ala Tyr Tyr Gln Gln
 325 330 335
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 Pro Gly Arg Glu Asp Glu Ala Ile Trp Ala Tyr Phe Ala Ser Val Gly
 355 360 365
 Phe Pro Pro Glu Glu Gln Val Arg Arg Thr Leu Asp Val Leu Ala Gln
 370 375 380
 Ala Gly Arg Pro Leu Ser Leu Pro Ala Leu Glu Pro Leu Val Asp Leu
 385 390 395 400
 Arg Arg Ser Arg Leu Glu Thr Met Leu Lys Val Leu Asp Val Asp Gly
 405 410 415
 Ala Val Lys Arg Val Lys Gly Gly Trp Thr Ala Thr Gly Gln Pro Trp
 420 425 430
 Thr Tyr Asp Ala Glu Arg Tyr Ala Trp Val Ala Lys Gln Arg Ala Ala
 435 440 445
 Glu Gln Gln Ala Met Arg Asp Tyr Val Ala Thr Thr Gly Cys Arg Met
 450 455 460
 Glu Phe Leu Gln Arg Gln Leu Asp Asp Glu Lys Ala Val Pro Cys Gly
 465 470 475 480
 Arg Cys Asp Asn Cys Ala Gly Ser Trp Leu Glu Ala Val Val Ser Pro
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 Ala Ala Leu Ala Ala Ala Ala Gly Glu Leu Asp Arg Ala Gly Val Glu
 500 505 510
 Val Glu Ser Arg Lys Met Trp Pro Thr Gly Leu Ala Ala Val Gly Met
 515 520 525
 Asp Leu Lys Gly Arg Ile Pro Ala Gly Gln Gln Ala Val Thr Gly Arg
 530 535 540
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 545 550 555 560

Leu Leu Ser Ala Gln Ala Ala Asp Gly Pro Val Pro Asp Asp Val Leu
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 Ala Ala Val Val Thr Val Leu Ala Asp Trp Ala Arg Ser Pro Gly Gly
 580 585 590
 Trp Ala Ser Gly Gly Pro Asp Ala Met Ala Arg Pro Val Gly Ile Val
 595 600 605
 Ala Met Pro Ser Arg Thr Arg Pro Arg Leu Val Ala Ser Leu Ala Glu
 610 615 620
 Gly Val Ala Arg Val Gly Arg Leu Pro Leu Leu Gly Ser Leu Ala Tyr
 625 630 635 640
 Thr Pro Gln Ala Asp Val Tyr Gly Ala His Arg Ser Asn Ser Ala Gln
 645 650 655
 Arg Leu Arg Ala Leu Ala Asp Ser Phe Thr Val Pro Glu Glu Leu Ala
 660 665 670
 Ala Ala Leu Ala Ala Ala Pro Gly Pro Val Leu Leu Val Asp Asp Tyr
 675 680 685
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<211> 2160

<212> DNA

<213> Streptomyces aizunensis

<400> 3

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| gagcgccggc gggccctggt ggtgcagcgc acgggctggg gcaagtccgc ggtctacttc | 180 |
| gtcgccaccg ctctgctgcg ccggcgcggc tccgggccga cggatgatcat ttctccgctg | 240 |
| ctggcgctga tgcgcaacca ggtcgaggcg gccgcgcggg ccgggatcca ggcgcgcacg | 300 |
| atcaactcgg ccaaccggga ggagtgggaa accatctacg gggagggtcga gcgcggcgag | 360 |
| accgatgtgc tctcgtcag ccccgagcgc ctcaactccg tggatttccg cgaccaggta | 420 |
| ctgcccaagc tggcggccac gacgggtctg ctggtggctg acgaggcgca ctgcatctcc | 480 |
| gactggggcc acgacttccg ccccgactac cgacggctgc gcacgatgct ggcggagctg | 540 |
| ccggagggcg tgccggtcct ggccacgacg gcgaccgcga acgcgcgggt gaccgcggac | 600 |
| gtggcgggagc agctgggcac gcacggcgag cacgccttgg tctgcgcgg accgctcgac | 660 |
| cgggagagcc tgcggctggg agtgctgcag ctgccggacg cggcgaccg gctggcctgg | 720 |

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<212> PRT
<213> Streptomyces aizunensis

<400> 4

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Asp Glu Ser Arg Ile Gln Leu Val Cys Leu Pro His Ala Gly Gly Ser

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Ser | Phe | Tyr | Phe | Pro | Met | Ser | Gln | Ser | Leu | Ala | Pro | Ala | Met | Asp |
| | 35 | | | | | 40 | | | | | 45 | | | | |
| Val | Leu | Ser | Val | Gln | Tyr | Pro | Gly | Arg | Gln | Asp | Arg | Arg | Asp | Glu | Pro |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Gly | Ile | Val | Asp | Ile | Gly | Ala | Tyr | Ala | Asp | Ala | Leu | Thr | Glu | Gln | Leu |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Val | Pro | Trp | Leu | Asp | Arg | Pro | Leu | Ala | Phe | Phe | Gly | His | Ser | Met | Gly |
| | | | 85 | | | | | | 90 | | | | | 95 | |
| Ala | Ile | Leu | Ala | Phe | Glu | Val | Thr | Arg | Arg | Leu | Glu | Arg | Asp | His | Gly |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Val | Thr | Pro | Glu | His | Ile | Phe | Ala | Ser | Gly | Arg | Arg | Ser | Pro | Ala | Ser |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Phe | Arg | His | Glu | Thr | Val | His | Leu | Arg | Asp | Asp | Asp | Gly | Ile | Val | Ala |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Glu | Met | Arg | Glu | Leu | Ser | Gly | Thr | Asp | Ala | Lys | Ile | Leu | Gly | Asn | Glu |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Glu | Ile | Leu | Arg | Met | Val | Leu | Pro | Ala | Ile | Arg | Ser | Asp | Tyr | Thr | Ala |
| | | | 165 | | | | | | 170 | | | | | 175 | |
| Ile | Glu | Asn | Tyr | Arg | Ala | Ala | Pro | Glu | Asp | Val | Val | Arg | Thr | Pro | Ile |
| | | 180 | | | | | | 185 | | | | | 190 | | |
| Thr | Val | Leu | Thr | Gly | Asp | Ala | Asp | Pro | Arg | Thr | Ser | Arg | Glu | Glu | Ala |
| | 195 | | | | | | 200 | | | | | 205 | | | |
| Asp | Ala | Trp | Lys | Ala | His | Thr | Thr | Gly | Gly | Phe | Asp | Leu | His | Ser | Phe |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Pro | Gly | Gly | His | Phe | Phe | Leu | Ala | Asn | His | Gln | Glu | Lys | Ile | Met | Gly |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Ile | Ile | Ser | Glu | Glu | Leu | Ser | Ala | Pro | Ala | Arg | Met | Ala | | | |
| | | | 245 | | | | | 250 | | | | | | | |

<210> 5

<211> 762

<212> DNA

<213> Streptomyces aizunensis

<400> 5

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| atccaattgg tctgtctgcc gcacgccggt ggctcggcct ccttctactt cccatgtcc | 120 |
| cagtcgctgg ctccggcgat ggacgtcctc tcggtccagt accccggcag gcaggaccgc | 180 |
| agggacgagc ccgggatcgt ggacatcggc gcctacgcgg acgccctgac cgagcaactc | 240 |
| gtaccgtggc tcgaccggcc cctggccttc ttcggccaca gcatgggtgc gatcctcgcc | 300 |

ttccgaggtga cgcgcaggct ggagcgtgac cacggcgtca ctccggagca catcttcgct 360
 tccggccggc gctcgccgc cagtttccgg cacgagaccg tgcacctgcg ggacgacgac 420
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 ccgaggacca gccgggaaga ggccggacgc tggaaggcgc acacgaccgg cggattcgat 660
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 <211> 956
 <212> PRT
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<400> 6

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 35 40 45
 Glu Glu Ala Ile Ser Ala Gly Ala Leu Val Leu Glu Ala Thr Gly Ser
 50 55 60
 Arg Ala Glu Arg Tyr Leu Pro Phe Gly Ile Leu Arg Arg Ile Leu Asp
 65 70 75 80
 Ser Ala Ala Pro Leu Ser Pro Glu Ile His Ala Tyr Ala Thr Glu Leu
 85 90 95
 Leu Asp Arg Val Ser Ala Gly Thr Thr Asp Ala Glu Gly Ala Val Glu
 100 105 110
 Ala Gly Met Arg Val Leu Pro His Val Ala Thr Ala Leu Leu Arg Ile
 115 120 125
 Ala Arg Asn Arg Thr Val Val Ile Ala Ile Asp Asp Val His His Gly
 130 135 140
 Asp Glu Leu Ser Leu Ala Phe Leu Leu Cys Leu Ala Arg Arg Val Arg
 145 150 155 160
 Gln Ala Gly Val Leu Ile Val Leu Thr Glu Ala Val Arg Leu Arg Ser
 165 170 175
 Ala Gln Leu Ala Phe His Ala Glu Leu Gln Arg Gln Pro Asn Cys Thr
 180 185 190

Ser Leu Arg Leu Pro Leu Leu Thr Thr Arg Gly Thr Thr Arg Val Leu
 195 200 205
 Ala Glu His Phe Ser Pro Ser Thr Ala Gln Arg Leu Ser Ala Glu Cys
 210 215 220
 Gln Glu Thr Thr Gly Gly Asn Pro Leu Leu Val Arg Ala Leu Ile Asp
 225 230 235 240
 Asp Gly Leu Thr Ala Leu Gly Asp Ser Glu Pro Phe Gln Arg Leu Ala
 245 250 255
 Pro Ala Glu Thr Phe Glu Arg Ala Val Leu Asp Cys Leu His Arg Gly
 260 265 270
 Asp Pro Glu Leu Leu Thr Val Ala Arg Gly Val Ala Val Leu Gly Ser
 275 280 285
 Ala Cys Ser Leu Ala Leu Leu Asn Gly Ile Val Asp Leu His Ala Lys
 290 295 300
 Ala Thr Glu Gln Ala Leu Gln Asp Leu Ser Arg Cys Ala Val Leu His
 305 310 315 320
 His Gly Ser Phe Arg Asp Pro Ala Ala Arg Thr Ala Val Leu Glu Ala
 325 330 335
 Thr Pro Pro Ala Ala Leu Ser Ala Leu His Leu Arg Thr Ala Arg Leu
 340 345 350
 Leu His Gln Glu Gly Ala Thr Ala Leu Asp Val Ala Arg His Leu Leu
 355 360 365
 Ala Ala Arg Lys Asn Val Glu Asp Trp Ala Ile Pro Val Leu Gln Glu
 370 375 380
 Ala Val Glu Tyr Ala Leu Val Glu Asp Glu His Glu Leu Ala Leu Arg
 385 390 395 400
 Cys Gly Glu Leu Ala Val Ala Ser Cys Ala Glu Gly Pro Arg His Ala
 405 410 415
 Ala Leu Lys Ser Arg Leu Ala Ser Ile Val Trp Arg Ser Ser Pro Ala
 420 425 430
 Ala Ala Glu Gly His Leu Arg Gln Leu Ser Arg Glu Leu Ala Ala Gly
 435 440 445
 Arg Leu Ala Asp Arg Asp Leu Val Gln Ala Val Ser Leu Leu Ala Trp
 450 455 460
 Met Gly Glu Ser Arg Gly Ala Gly Glu Ala Val Leu Arg Leu Gln Arg
 465 470 475 480
 Thr Asp Ser Glu Ala Glu Ala Ala Gly Arg Ala Pro Ala Tyr Asp Pro
 485 490 495
 Gly Thr Leu Thr Ala Ala Gln Ser Trp Leu Ser Met Val Ser Pro Pro
 500 505 510

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Arg | Asp | Leu | Phe | Asp | Ala | Val | Glu | Pro | Arg | Arg | Thr | Thr | Leu | Ser | 515 | 520 | 525 |
| Gly | Ala | Pro | Gly | Ala | Leu | Pro | Gly | Ala | Gly | Pro | Asp | Thr | Val | Pro | Tyr | 530 | 535 | 540 |
| Asp | Met | Pro | Asp | Asn | Ala | Tyr | Val | Gln | Ala | Ala | Asp | Ala | Val | Arg | Thr | 545 | 550 | 555 |
| Ala | Leu | Arg | Gly | Gly | Thr | Gln | Ala | Asp | Ala | Ala | Val | Ser | Lys | Ala | Thr | 565 | 570 | 575 |
| Arg | Val | Leu | Gln | Arg | Tyr | His | Leu | Ser | Asp | Arg | Thr | Leu | Gln | Pro | Leu | 580 | 585 | 590 |
| Val | Phe | Ala | Leu | Leu | Ala | Val | Ile | Tyr | Ala | Gly | Arg | Leu | Asp | Leu | Ala | 595 | 600 | 605 |
| Ser | Ala | Trp | Cys | Glu | Arg | Leu | Leu | Gly | Glu | Cys | Ser | Ala | Arg | Asn | Ala | 610 | 615 | 620 |
| Pro | Thr | Trp | Gln | Ala | Ala | Leu | Gly | Val | Val | Arg | Ala | Glu | Ile | Leu | Leu | 625 | 630 | 635 |
| Arg | Gln | Gly | Asp | Leu | Pro | Gly | Ala | Ala | Ala | Gln | Ala | Arg | His | Ala | Met | 645 | 650 | 655 |
| Ser | Arg | Ile | Ser | Leu | Gln | Ser | Trp | Gly | Val | Gly | Ile | Ala | Leu | Pro | Leu | 660 | 665 | 670 |
| Ala | Val | Leu | Val | Glu | Ala | Glu | Val | Gln | Met | Gly | Asp | His | Glu | Glu | Ala | 675 | 680 | 685 |
| Met | Ser | Leu | Leu | Glu | Gln | Pro | Val | Pro | Gln | Ala | Met | Phe | Asp | Thr | Leu | 690 | 695 | 700 |
| Ala | Gly | Leu | His | Tyr | Leu | Arg | Ala | Arg | Gly | Arg | Cys | His | Leu | Ala | Thr | 705 | 710 | 715 |
| Gly | Arg | Tyr | His | Ala | Ala | Val | Arg | Asp | Phe | Leu | Asn | Cys | Gly | Glu | Leu | 725 | 730 | 735 |
| Met | Gln | Ala | Trp | Gly | Val | Asp | Gly | Ala | Glu | Leu | Val | Pro | Trp | Arg | Leu | 740 | 745 | 750 |
| Asp | Ala | Ala | Glu | Ala | Trp | Leu | Ala | Leu | Gly | Asn | Val | Ala | Arg | Ala | Lys | 755 | 760 | 765 |
| Glu | Tyr | Thr | Glu | Gln | Gln | Lys | Gln | Arg | Glu | Thr | Gly | Pro | Val | Gly | Ser | 770 | 775 | 780 |
| Arg | Thr | Arg | Gly | Ser | Leu | Leu | Leu | Thr | Leu | Ala | His | Thr | Gly | Gly | Asp | 785 | 790 | 795 |
| Leu | Thr | Val | Arg | Leu | Lys | Arg | Leu | Val | Glu | Ala | Val | Glu | Thr | Leu | Glu | 805 | 810 | 815 |
| Glu | Gly | Gly | Asp | Arg | Leu | Gln | Leu | Ala | Val | Ala | Leu | Gly | Glu | Leu | Gly | 820 | 825 | 830 |

Arg Gly Tyr Arg Ala Leu Gly Asp Phe Asn Arg Ala Arg Met Leu Val
 835 840 845
 Arg Lys Ala Trp His Val Ala Lys Ser Cys Gly Ala Glu Pro Leu Cys
 850 855 860
 Gln Gln Phe Met Pro Gly Gln Val Asp Gly Glu Ala Gly Ala Gln Ser
 865 870 875 880
 Gly Arg Glu Ala Glu Leu Pro Ser Glu Val Glu Val Leu Ser Glu Ala
 885 890 895
 Glu Ala Arg Val Ala Leu Leu Ala Ala Arg Gly His Thr Asn Arg Glu
 900 905 910
 Ile Ala Thr Lys Leu Tyr Val Thr Val Ser Thr Val Glu Gln His Leu
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<211> 2871

<212> DNA

<213> Streptomyces aizunensis

<400> 7

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| acgagtcctgc tggaaatctt caccgaagag gcgatctccg cgggcgcgct ggtgctggaa | 180 |
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| agcgccggga cgacggacgc cgaaggcgcc gtcgaggccg gtatgcgcgt cctgccccat | 360 |
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| tccgccgagt gccaggagac caccggcggc aatccactgc tggtcagggc gctgatcgac | 720 |
| gacggcctca cggcgctcgg agacagcgag cccttcagc ggctcgcccc cgccgaaacc | 780 |
| ttcgaacgcg ccgtgctcga ctgcctgcac cgcgcgacc ccgagctgct gaccgtcgcc | 840 |
| cgggcgctcg ccgtactcgg tagcgctgc tccttggccc tgctcaacgg gatcgctgac | 900 |

| | |
|--|------|
| ctgcacgcca aggccaccga acaggccctt caggacctca gccggtgcgc cgtcctgcac | 960 |
| cacggctcct tccgcgaccc ggcgggccgt accgccgtcc tggaagccac tccgcccgcg | 1020 |
| gcgctgtccg ccctgcacct gcgcaccgcg cgactcctgc accaggaagg cgcgacggcg | 1080 |
| ctcgatgtcg cccgccacct cctcgccgcc cgcaagaacg tcgaggactg ggcgatcccc | 1140 |
| gtcctccagg agggcggtcga gtacgccctc gtcgaggacg agcacgaact cgccctgcgg | 1200 |
| tgcggggaac tggcggtgcg ctctgcgcg gagggccccc gacacgccgc cctgaagtcc | 1260 |
| cgcttggcga gcatcgtctg gcgcagcagc ccggccgccc ctgaaggga tctgcggcag | 1320 |
| ctgtcccgcg aactcgccgc cggccggctc gccgaccgcg atctcgtcca ggccgtgtcg | 1380 |
| ctcctggcgt ggatggggga gtcccggggg gccggcgagg cggtagtgcg actgcagcgg | 1440 |
| accgacagcg agggcgaggc ggccggacgg gcgcccgcct acgaccggg cacgctcacc | 1500 |
| gccgcacaga gctggctctc gatggtcagc ccgccggccc gcgacctctt cgacgccgtg | 1560 |
| gaaccgcgcc ggacaacgct gtcaggcgcg ccggggggcg tgcccggcg ggggcccga | 1620 |
| accgtccct acgacatgcc cgacaacgcc tacgtccagg ccgccgacgc cgtccgcacc | 1680 |
| gccctgcgcg gcggaacca ggccgacgcc gccgtcagca aggccaccg ggtgctccag | 1740 |
| cgctaccacc tgagcgaccg caccctccag ccgctcgtct tcgccctcct cgccgtcatc | 1800 |
| tacgcggtc gctcgcacct cgcgtccgcc tgggtcgaac gactgctcgg cgagtgtcc | 1860 |
| gcccgcaacg ccccgacctg gcaggccgcc ctcggtgtgg tccgggccga gatcctgtg | 1920 |
| cgccaggcg atctgcccgg tgcggccgcc caggccgcc acgccatgtc ccgatctcc | 1980 |
| ctgcagagct gggcggtggg catcgcgctg ccgctggccg tcctcgtcga ggccgaggtc | 2040 |
| cagatggcg accacgagga ggcgatgagc ctgctcgaac agccggtgcc ccaggccatg | 2100 |
| ttcgacacc tggccggcct gcactacctc agggcccgcg gccgctgcca cctggccacc | 2160 |
| ggccgctacc acgccgccgt gcgggacttc ctgaactgcg gcgagctgat gcaggcctgg | 2220 |
| ggcgtggacg gggcgagct ggtgccgtgg cggctggacg ccgccaggc gtggctggcc | 2280 |
| ctcggcaacg tcgcgcgcg caaggagtag accgagcagc agaagcagcg cgagacgggg | 2340 |
| cccgtggga gccggacgcg tggctccctg ctgctcacgc tcgcccacac cggcggtgac | 2400 |
| ctcacggtcc ggctcaagcg gctcgtcag gccgtcgaga ccctggagga gggcggggac | 2460 |
| cggctccagc tggcggtggc gctgggggag ctgggccgcg gctaccgtgc gctgggcgac | 2520 |
| ttcaaccggg cccggatgct ggtgcgcaag gcctggcacg tcgccaagtc ctgcggcgcc | 2580 |
| gaaccgctgt gccagcagtt catgccgggg caggctcagc gcgaggccgg tgcgcagagc | 2640 |
| ggccgggagg cggagcttcc cagcgaggtc gaggtcctgt ccgaggccga ggcgcgggtc | 2700 |

gcgctgctgg cggcgcgcg cccacaccaac cgtgagatag cgaccaagct ctacgtcacg 2760
 gtgtccacgg tgcagcagca tctgacgcgc atctaccgca agctgaaggt gaagcggcgc 2820
 cgcgatctgc cgcggcggt gtcggacctg agcctgccga gcatcgctg a 2871

<210> 8
 <211> 201
 <212> PRT
 <213> Streptomyces aizunensis
 <400> 8

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Leu | Val | Asp | Asp | His | Pro | Val | Val | Arg | Glu | Gly | Leu | Ser | Ser | Met |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Leu | Gln | Ser | Ala | Asp | Gly | Val | Ser | Val | Val | Gly | Gln | Ala | Asp | Ser | Gly |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Glu | Glu | Ala | Ile | Ala | Met | Val | Thr | Arg | Leu | Ala | Pro | Asp | Ile | Val | Leu |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Leu | Asp | Leu | Gln | Met | Gly | Gly | Met | Asp | Gly | Val | Glu | Thr | Thr | Gly | His |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Leu | Leu | Arg | Val | Ala | Pro | Ala | Thr | Lys | Val | Val | Ile | Val | Thr | Thr | Tyr |
| 65 | | | | | 70 | | | | 75 | | | | | | 80 |
| Glu | Ser | Asp | Thr | Asp | Ile | Leu | Arg | Ala | Val | Glu | Ala | Gly | Ala | Ala | Gly |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Tyr | Leu | Leu | Lys | Gly | Ser | Ser | Arg | Asp | Glu | Leu | Val | Gln | Ala | Val | Lys |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Ala | Ala | Ala | Arg | Gly | Glu | Thr | Val | Leu | Thr | Pro | Ser | Leu | Ala | Pro | Lys |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Leu | Phe | Arg | Ala | Arg | Val | Val | Glu | Pro | Pro | Ala | Leu | Ser | Asp | Arg | Glu |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Arg | Glu | Val | Leu | Gln | Leu | Val | Ser | Leu | Gly | Leu | Thr | Asn | Ala | Asp | Ile |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Gly | Arg | Gln | Leu | Phe | Ile | Ser | Glu | Ala | Thr | Val | Lys | Thr | His | Leu | Leu |
| | | | 165 | | | | | | 170 | | | | | 175 | |
| Arg | Ser | Phe | Lys | Lys | Leu | Ser | Val | Ser | Asp | Arg | Thr | Ala | Ala | Val | Ile |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Thr | Ala | Leu | Lys | Leu | Gly | Leu | Leu | Ser | | | | | | | |
| | | 195 | | | | | 200 | | | | | | | | |

<210> 9
 <211> 606
 <212> DNA
 <213> Streptomyces aizunensis

<400> 9
 atgctggctg acgaccaccc ggtcgtacgg gagggctctca gctcgatgct gcaatccgcc 60

gacggcggtga gcgtcgtcgg gcaggccgac tcggggcgagg aggcgatcgc gatggtcacc 120
agacttgctc cgcacatcgt cctgctcgac cttcagatgg gcgggatgga cgggggtggag 180
accaccggcc acctgctgcg cgtcgcgccg gccaccaagg tggatgatcgt gacgacgtac 240
gagagcgaca cggacatcct gcggggccgtg gaggcggggcg cggcgggcta cctgctcaag 300
ggcagctcgc gcgacgaact ggtgcaggcg gtaaaggcgg cggcccgcgg tgagacggtc 360
ctgacgccgt cgctcgcccc caagctgttc cggggccggg tggaggagcc gcccgcgctg 420
tcggaccgtg agcgcgaggt gctccagttg gtcagcctcg ggctgaccaa cgcgacatc 480
ggccgccagc tggtcatcag cgaggcgacg gtgaagacgc atctgctgcg ctcgttcaag 540
aagctgtcgg tctcggaccg gacggccgcg gtgatcacgg cactgaagct cggcctgctg 600
tcctga 606

<210> 10
<211> 416
<212> PRT
<213> Streptomyces aizunensis

<400> 10

Val Ser Thr Glu Ser Pro Ala Ala Gln Ala Thr Asp Gly Gln Asp Asp
1 5 10 15
Ala Pro Glu Ala Gly Ala Arg Trp Phe Gly Leu Trp Asp Ala Leu Phe
20 25 30
Ala Val Ser Tyr Ala Val Thr Thr Met Leu Leu Phe Thr Ser Asp Gly
35 40 45
Glu Gln Val His Arg Ala Val Ala Met Ala Ala Leu Thr Ala Ala Val
50 55 60
Pro Trp Tyr Ala Ala Leu Gly Arg Ser Thr Met Val His Glu Gly Gln
65 70 75 80
Gly Pro Val Arg Arg Ser Val Val Phe Ser Val Gly Leu Phe Val Leu
85 90 95
Phe Ala Val Ala Val Val Phe Asp Leu Ala Ala Ser Phe Ala Leu Phe
100 105 110
Ala Val Val Pro Met Leu Met Met Ser Leu Ala Thr Ser Pro Ala Ile
115 120 125
Ala Val Val Thr Leu Ala Asn Leu Val Pro Val Ile Val Val Trp Leu
130 135 140
Arg Gly Gly Thr Leu Ser Arg Asp Ile Leu Ala Val Leu Pro Thr Ser
145 150 155 160
Leu Leu Gly Ile Ala Leu Ser Val Met Leu Gly Leu Trp Ile Thr Arg

gggcccggtcc ggcgcagcgt cgtcttctcc gtcggcctgt tcgtgctggt cgcggtggcc 300
 gtgggtcttcg acctcgcggc ctcggttcgcg ctgttcgccg tgggtccgat gctgatgatg 360
 agcctggcga cctcgccggc catcgccgtg gtcacgctgg ccaatctggt tccggtcac 420
 gtgggtgtggc tgcgcggcgg caccctgagc cgcgacatcc tggccgtcct gccgacctcg 480
 ctctctcgga tcgccctgtc ggtcatgtc gggctgtgga tcacccgggt gaccggcag 540
 agccgtgacc gggccgagct catcgaggag ttgcaccgca accgtgcgca agtcgcccgg 600
 ctgtcgcgca aggggggggt ctccgccgag cgcgagcggc tcgcccggga gatccacgac 660
 accctcgccc agggcctcac cagcatcatc agcctcgtac aggcgcgca gaccgacttc 720
 acggccgacc cggaccgggc gagggcgcat ctggcactgg cgggcccgtt ggcccgcgaa 780
 agcctgggag aagcccgcga gttcgtcacc gagctgacct cggccgcgt gcaggagtcc 840
 tcgctcgtgc aggcgacgcg gcggcaggcc gagggcctga cggcgagac cggcatgcgg 900
 gcgcacgtca ccgtcgaagg agacgagcgg gaactgccga tggcgatcag cgtggtcctg 960
 ctgcgttccc tccaggaggc catcgcaaac atccgcaagc acgcggggaa ggcacgcgcg 1020
 gccgagatcc ggctcgtgta cgaacaggac accgtacggc tgctcgtacg ggacgacgga 1080
 cccgggttca ccgtcaccgg ggaccagcgg ggaagcgggc tgcgcggcat gcagactcgc 1140
 gcacacgaga tcagcggggc ggcgaccgtg gtcagcagcc ccggacaggg caccaccatc 1200
 gaagtgcggg tgcccgtgcc cgcgaaggga gaggaagccg atgagcgctg a 1251

<210> 12
 <211> 186
 <212> PRT
 <213> Streptomyces aizunensis

<400> 12

Leu Ser Pro Phe Leu Asn Thr Leu Ile Ala Ser Gly Thr Ile Leu Ala
 1 5 10 15
 Val Ile Leu Ser Thr Asp Leu Gly Thr Arg Lys Val Thr Thr Thr Arg
 20 25 30
 Met Leu Pro Ser Leu Leu Ala Val Val Val Ile Leu Ala Leu Leu Val
 35 40 45
 His Thr Leu Pro Leu Asp Gly Asn Asp Pro Ser Leu Gln Leu Ala Gly
 50 55 60
 Ile Gly Ala Gly Ile Ile Cys Gly Leu Ala Ala Thr Ala Leu Leu Pro
 65 70 75 80
 Ala His Arg Asn Ala Ser Gly Glu Val Ser Thr Lys Gly Gly Ile Gly
 85 90 95

Tyr Ala Leu Val Trp Thr Ala Leu Ser Ala Ser Arg Val Leu Phe Ala
 100 105 110
 Tyr Gly Ser Gln His Trp Phe Ser Glu Gly Ile Val Arg Phe Ser Thr
 115 120 125
 Asp Tyr Lys Leu Ser Gly Gln Ala Val Tyr Ser Asn Ala Phe Ala Phe
 130 135 140
 Met Ala Leu Ala Met Val Leu Thr Arg Thr Ala Val Leu Leu Asn Thr
 145 150 155 160
 Arg Arg Arg Leu Arg Gly Gly Gln Leu Pro Ala Ala Asp Asn Thr Ala
 165 170 175
 Pro His Gln Ala Ser Ser Ala Asn Thr His
 180 185

<210> 13
 <211> 561
 <212> DNA
 <213> Streptomyces aizunensis

<400> 13
 ctgagcccggt tcttgaacac actgatcgcc agcgggacga tcttgcccggt cattctgtcg 60
 accgacctcg gcacccgcaa agtcaccacg acgcggatgc ttccttcgct cctcgcggtc 120
 gtcgtgatcc tcgcgctcct cgtgcacaca ctgccgctcg acggcaacga cccctcgctc 180
 caactggcgg gcacgcggcg cggtatcatc tgcggactgg ccgccacggc gctcctcccc 240
 gccaccgga acgcttcggg tgaggtctcc accaagggcg gtatcgggta cgcgctgggtg 300
 tggaccgcgc tgtccgcctc gcgtgtgctc ttcgcctacg gttcacagca ctgggttcagc 360
 gagggcatcg tccgggttcag caccgactac aagctcagcg gacaggccgt ctactccaac 420
 gctttcgcct tcatggccct ggccatgggtg ctgacgcgga ccgccgtcct gttgaacacg 480
 cgccgccggc tgcgcggcgg gcagcttccc gcggccgaca acacggcccc acatcaggcg 540
 agttccgcca atacgcactg a 561

<210> 14
 <211> 163
 <212> PRT
 <213> Streptomyces aizunensis

<400> 14

Met His Asp Val Arg Leu Arg Pro Pro Arg Asn Arg Val Asp Ser Arg
 1 5 10 15
 Ala Val Gly Trp Trp Thr Val Gln Ser Ala Met Tyr Ala Leu Pro Leu
 20 25 30
 Pro Ile Thr Phe Gly Val Leu Tyr Leu Cys Ile Pro Pro Ala Arg Pro

| | | |
|---|-----|-----|
| 35 | 40 | 45 |
| Phe Phe Gly Trp Ala Phe Leu Ile Ser Leu Val Pro Gly Leu Ala Tyr | | |
| 50 | 55 | 60 |
| Met Ala Val Met Pro Ala Trp Arg Tyr Arg Val His Arg Trp Glu Thr | | |
| 65 | 70 | 75 |
| Thr Asp Glu Ala Val Tyr Ala Ala Ser Gly Trp Leu Trp Gln Gln Trp | | |
| | 85 | 90 |
| Arg Val Val Pro Met Ser Arg Ile Gln Thr Val Asp Thr Leu Arg Gly | | |
| | 100 | 105 |
| Pro Leu Gln Gln Leu Phe Gly Leu Ser Gly Ile Thr Val Thr Thr Ala | | |
| | 115 | 120 |
| Ser Tyr Ser Gly Ala Val Lys Ile Lys Gly Ile Asp His Arg Thr Ala | | |
| | 130 | 135 |
| Arg Asp Val Val Glu His Leu Thr Arg Val Thr Gln Ala Thr Pro Gly | | |
| | 145 | 150 |
| | | 155 |
| | | 160 |
| Asp Ala Thr | | |

<210> 15
 <211> 492
 <212> DNA
 <213> Streptomyces aizunensis

<400> 15
 atgcatgatg tcaggctccg gccccgcgc aatcgtgtcg actcccgggc agtgggctgg 60
 tggacgggtcc agtccgcgat gtacgccctg cccctgccga tcaccttcgg cgtgctgtac 120
 ctgtgcatcc cgcccgccag gccgttcttc ggctgggcct tcctgatctc gctcgtaccg 180
 ggcctcgctt acatggccgt catgcccgcc tggcgctacc ggggtgcaccg ttgggagacc 240
 accgacgaag ccgtctacgc ggcgctccggc tggctctggc agcagtggcg ggtcgtgccg 300
 atgtcccga tccagacggt ggacaccctg cgcggacccc tccagcagct cttcggcctc 360
 tccggcatca ccgtcaccac cgcctcctac tccggcgccg tgaagatcaa gggaatcgac 420
 caccggaccg cgcgggacgt ggtcgagcac ctcaccaggg tgaccaggc caccgccgga 480
 gacgcgacat ga 492

<210> 16
 <211> 514
 <212> PRT
 <213> Streptomyces aizunensis

<400> 16
 Met Ser His Asp Thr Gly Gln Trp Glu Ala Thr Ala Thr Ser His Gly
 1 5 10 15

Ala Ala Glu Asp Pro Glu Trp Ser Arg Leu Ser Pro Arg Leu Leu Leu
 20 25 30
 Val Asn Leu Ser Met Leu Ala Gly Pro Leu Ala Leu Phe Ala Val Thr
 35 40 45
 Val Ala Leu Thr Gly Ala Asn Leu Gln Ala Leu Ile Ser Leu Gly Ser
 50 55 60
 Leu Leu Ile Val Phe Leu Val Ile Thr Gly Ile Ser Thr Met Arg Leu
 65 70 75 80
 Leu Thr Thr Arg Phe Arg Val Thr Ala Glu Arg Val Glu Leu Arg Ser
 85 90 95
 Gly Leu Leu Phe Arg Ser Arg Arg Ser Val Pro Ile Asp Arg Val Arg
 100 105 110
 Ser Val Asp Val Glu Ala Lys Pro Val His Arg Leu Phe Gly Leu Ala
 115 120 125
 Ser Leu Arg Ile Gly Thr Gly Glu Gln Gly Ala Ser Ser Arg Arg Leu
 130 135 140
 Ser Leu Asp Gly Ile Thr Arg Arg Gln Ala Arg Arg Leu Arg Arg Leu
 145 150 155 160
 Leu Ile Asp Arg Arg Gly Ser Gly His Ala Thr Gly Gln Asp Gln Asp
 165 170 175
 Val Thr Ile Ala Glu Met Asp Trp Ala Trp Leu Arg Tyr Ala Pro Leu
 180 185 190
 Thr Ile Trp Gly Val Gly Ser Val Phe Ala Ala Val Gly Thr Ala Tyr
 195 200 205
 Arg Ile Leu His Glu Met Lys Val Asp Pro Leu Glu Leu Gly Val Val
 210 215 220
 Lys Asp Ile Glu Asp Arg Phe Gly Ser Val Pro Leu Trp Phe Gly Ile
 225 230 235 240
 Leu Val Ala Val Val Ile Thr Ala Val Val Gly Ala Ala Val Ser Thr
 245 250 255
 Ala Thr Phe Val Asp Ala Trp Thr Asn Tyr Arg Leu Glu Arg Glu Gly
 260 265 270
 Val Gly Ile Phe Arg Ile Arg Arg Gly Leu Leu Ile Ser Arg Ser Val
 275 280 285
 Thr Ile Glu Glu Arg Arg Leu Arg Gly Val Glu Leu Ala Glu Pro Met
 290 295 300
 Leu Leu Arg Trp Ala Gly Gly Ala Thr Leu Ser Ala Ile Ala Ser Gly
 305 310 315 320
 Leu Ser Asn Ser Gln Glu Asn Arg Ser Arg Cys Ser Leu Thr Pro Pro
 325 330 335

Val Pro Arg Asp Glu Ala Leu Arg Val Ala Ala Asp Val Leu Ala Glu
 340 345 350
 Glu Gly Ser Pro Thr Glu Leu Thr Lys Leu Val Arg His Ser Arg Ala
 355 360 365
 Ala Leu Arg Arg Arg Ile Asn Arg Gly Leu Leu Val Leu Ala Ala Val
 370 375 380
 Val Ala Val Pro Leu Gly Leu Gly Leu Trp Leu Thr Pro Val Leu Val
 385 390 395 400
 His Thr Ala Trp Ile Thr Ala Leu Val Gly Leu Pro Val Val Ile Val
 405 410 415
 Leu Ala Asn Asp Ala Tyr Arg Ser Leu Gly His Gly Ile Arg Asp Arg
 420 425 430
 Tyr Leu Val Val Arg Ala Gly Thr Phe Ala Arg Arg Thr Val Ala Val
 435 440 445
 Gln Arg Asp Gly Val Ile Gly Trp Asn Ile Ser Arg Ser Tyr Phe Gln
 450 455 460
 Arg Arg Ser Gly Leu Leu Thr Ile Gly Ala Thr Thr Ala Gly Val Gly
 465 470 475 480
 Cys His Lys Val Arg Asp Val Ser Val Gly Ala Gly Leu Ala Phe Ala
 485 490 495
 Glu Glu Ala Val Pro Arg Leu Leu Ala Pro Phe Ile Glu Arg Val Pro
 500 505 510

Arg Gly

<210> 17
 <211> 1545
 <212> DNA
 <213> *Streptomyces aizunensis*

<400> 17
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 cccgagtgga gcaggctcag cccccgactg ctgctggtca acctgagcat gctcgccggc 120
 ccgctcgccc tgttcgccgt caccgctgcc ctgaccggcg ccaacctcca ggccctcatc 180
 tccctcggtc ccttctgat cgtcttcttg gtcattaccg ggatcagcac gatgcggctg 240
 ctgaccaccc gtttcgccgt caccgccgaa cgcgtcgaac tgcgctcggg cctgctcttc 300
 cgcagccgcc gtcgggtccc catcgaccgg gtccgcagcg tcgacgtcga agccaagccg 360
 gtgcaccgcc tcttcggcct cgcctcgctg cgcattcgga ccggtgaaca gggcgcgctc 420
 agccgcaggc tctccctcga cggcatcacc aggcgtcagg cgcggcgact gcgcaggctc 480
 ctcatcgacc gccgtggcag cggccatgcc accggccagg accaggacgt caccatcgcc 540

| | | | | | | |
|-------------|------------|-------------|------------|------------|------------|------|
| gagatggact | gggcctggct | gcggtacgcg | ccgctcacca | tctggggcgt | cggcagcgtc | 600 |
| ttcgccgccg | tcggcaccgc | ctaccgcata | ctgcacgaga | tgaaggtcga | cccgctcgaa | 660 |
| ctgggcgtcg | tcaaggacat | cgaggaccgc | ttcggttcgc | taccctctgt | gttcggcata | 720 |
| ctcgctcgccg | tcgtgatcac | cgccgtcgtg | ggcgccgcgg | tctccaccgc | caccttcgtg | 780 |
| gacgcctgga | ccaactaccg | cctggagcgt | gagggggcgt | gcattcttcg | gatccgccgc | 840 |
| ggactgctca | tttcccgcct | cgtcaccata | gaggagcgcc | ggctgcgcgg | cgtcgagctc | 900 |
| gccgagccga | tgctgctgcg | ctggggcgccg | ggcgccaccc | tgagcgccat | cgccagcgcc | 960 |
| ctcagcaaca | gccaggagaa | ccgcagccgc | tggtccctca | ccccgcccgt | gccccgggac | 1020 |
| gaggcgctgc | gggtcgccgc | cgacgtcctc | gccgaggaag | ggccccgcac | ggagctgacc | 1080 |
| aagctcgtcc | ggcactcccc | tgccgccttg | cgccgtcgca | tcaaccgcgg | cctgctggtc | 1140 |
| ctcgccggccg | tcgtcgccgt | gccgctgggc | ctggggctgt | ggctcacccc | cgctcctggg | 1200 |
| cacaccgcct | ggatcacggc | gctcgtcggc | ctgccggctg | tcctcgtcct | cgccaacgac | 1260 |
| gcctaccgct | ccctcgccca | cggaatccgc | gaccgctacc | tcgtcgtccg | cgccggcacc | 1320 |
| ttcgccccgc | gtacggtcgc | cgtccagcgg | gacggcgctc | tcggctggaa | catctcccgc | 1380 |
| tcctacttcc | agcggcgagc | cggactgctc | accatcgccg | ccaccaccgc | ggggtcgggc | 1440 |
| tgccacaagg | tgcgcgacgt | atccgtcggc | gccggcctcg | ccttcgccga | agaggccgta | 1500 |
| cccaggtgc | tcgccccgtt | catcgaacgc | gtcccgcgcg | gctga | | 1545 |

<210> 18
 <211> 164051
 <212> DNA
 <213> Streptomyces aizunensis

| | |
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| <400> 18 | |
| ctggctcagc | ccgccagctc |
| ctccagcctc | ggcaccagcg |
| acaccggaga | gggcatcgtc |
| | 60 |
| cggtatctccg | cgcgcacctc |
| gcgcgcggcc | gccgtcatct |
| tctcgtccga | aagcagctgt |
| | 120 |
| acgaggacct | ccgcggagag |
| gtcgtcggcg | gtgccgagca |
| gaccggcacc | ccggtcccgt |
| | 180 |
| acggcctccg | cattgatgtg |
| acggctccgt | ccgtccggca |
| ggacgagctg | cggcacaccg |
| | 240 |
| gcgttcagcg | ccgccagcgt |
| cgtccccgca | ccaccgtggg |
| gcacggccgc | gtcgcaggtc |
| | 300 |
| tgacgagcg | ccgtcagcgg |
| cacccacccc | acggccccga |
| cggtgggagg | cagttcaccg |
| | 360 |
| agcgccgtgg | tgtccacata |
| gcccagcgcc | agcacgaact |
| cggcgtccac | cccggcagcc |
| | 420 |
| gccgcccga | gccgctgcac |
| cgggcccagg | ccgttgatgt |
| ggaccgaggc | cgtgccgagc |
| | 480 |
| gtcacccga | cccggcgccg |
| ccccggcttc | tccagcagcc |
| agtccggcag | caccgcaccg |
| | 540 |

| | | | | | | |
|-------------|-------------|-------------|-------------|-------------|-------------|------|
| ctgttgtagc | ggaccggccg | catcgaccag | ccgtcccgct | cgggctccgc | catgctcggc | 600 |
| ggcgcgatgt | cgatcaccgg | gaccggttcg | gacacccggt | ccacgccgtg | ccgcgccatc | 660 |
| gtctcgggtga | gcatcgacac | cgtcagctcg | cgcagctgcg | taccccgcg | gaaaccgaag | 720 |
| ttgtgctgca | cggccggcac | accagccgc | gccgccgcga | tcagaccgga | cacgaagatc | 780 |
| tgctcgaaga | cgatcagatc | gggcgggaaa | tcgtcggcgg | tccgcacgat | gccgtccgcc | 840 |
| aggtggttgt | tgaggtgggc | gaagagggtc | agcccggtcca | tcgggtcgac | gccgcccggga | 900 |
| ccgcgcaggc | gggccatcag | ctcaccggcc | gtcgactgga | ggaagtcctc | caggtggaag | 960 |
| ccggggggcga | catccgccac | gtgcagaccg | gcgttggcgg | cctccagcgc | gtcaccgcgc | 1020 |
| ctggcgacca | gcacctcggtg | gccggccgag | cgcaacgccc | aggccagcgg | aacaatggga | 1080 |
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| Val | Thr | Tyr | Pro | Ala | Ile | Gly | His | Val | Phe | Pro | Ile | Val | Pro | Leu | Ala | 1 | 5 | 10 | 15 |
| Trp | Ala | Leu | Arg | Ser | Ala | Gly | His | Glu | Val | Leu | Val | Ala | Ser | Ala | Gly | 20 | 25 | 30 | |
| Asp | Ala | Leu | Glu | Ala | Ala | Asn | Ala | Gly | Leu | His | Val | Ala | Asp | Val | Ala | 35 | 40 | 45 | |
| Pro | Gly | Phe | His | Leu | Glu | Asp | Phe | Leu | Gln | Ser | Thr | Ala | Gly | Glu | Leu | 50 | 55 | 60 | |
| Met | Ala | Arg | Leu | Arg | Gly | Pro | Gly | Gly | Val | Asp | Pro | Met | Asp | Gly | Leu | 65 | 70 | 75 | 80 |
| Thr | Leu | Phe | Ala | His | Leu | Asn | Asn | His | Leu | Ala | Asp | Gly | Ile | Val | Arg | 85 | 90 | 95 | |
| Thr | Ala | Asp | Asp | Phe | Arg | Pro | Asp | Leu | Ile | Val | Phe | Glu | Gln | Ile | Phe | 100 | 105 | 110 | |
| Val | Ser | Gly | Leu | Ile | Ala | Ala | Ala | Arg | Leu | Gly | Val | Pro | Ala | Val | Gln | 115 | 120 | 125 | |
| His | Asn | Phe | Gly | Phe | Ala | Arg | Gly | Thr | Gln | Leu | Arg | Glu | Leu | Thr | Val | 130 | 135 | 140 | |
| Ser | Met | Leu | Thr | Glu | Thr | Met | Ala | Arg | His | Gly | Val | Asp | Arg | Val | Ser | 145 | 150 | 155 | 160 |
| Glu | Arg | Val | Pro | Val | Ile | Asp | Ile | Ala | Pro | Pro | Ser | Met | Ala | Glu | Pro | 165 | 170 | 175 | |
| Glu | Arg | Asp | Gly | Trp | Ser | Met | Arg | Pro | Val | Pro | Tyr | Asn | Ser | Gly | Ala | 180 | 185 | 190 | |
| Val | Leu | Pro | Asp | Trp | Leu | Leu | Glu | Lys | Pro | Gly | Arg | Arg | Arg | Val | Gly | 195 | 200 | 205 | |
| Val | Thr | Leu | Gly | Thr | Ala | Ser | Val | His | Ile | Asn | Gly | Leu | Gly | Pro | Val | 210 | 215 | 220 | |
| Gln | Arg | Leu | Ala | Ala | Ala | Ala | Ala | Gly | Val | Asp | Ala | Glu | Phe | Val | Leu | 225 | 230 | 235 | 240 |
| Ala | Leu | Gly | Asp | Val | Asp | Thr | Thr | Ala | Leu | Gly | Glu | Leu | Pro | Pro | Asn | 245 | 250 | 255 | |
| Val | Arg | Ala | Val | Gly | Trp | Val | Pro | Leu | Thr | Ala | Leu | Leu | Gln | Thr | Cys | 260 | 265 | 270 | |
| Asp | Ala | Ala | Val | His | His | Gly | Gly | Ala | Gly | Thr | Thr | Leu | Ala | Ala | Leu | 275 | 280 | 285 | |
| Asn | Ala | Gly | Val | Pro | Gln | Leu | Val | Leu | Pro | Asp | Gly | Ala | Asp | Arg | His | 290 | 295 | 300 | |
| Ile | Asn | Ala | Glu | Ala | Val | Arg | Asp | Arg | Gly | Ala | Gly | Leu | Leu | Gly | Thr | 305 | 310 | 315 | 320 |

Ala Asp Asp Leu Ser Ala Glu Val Leu Val Gln Leu Leu Ser Asp Glu
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Lys Met Thr Ala Ala Ala Arg Glu Val Arg Ala Glu Ile Arg Thr Met
340 345 350

Pro Ser Pro Val Ser Leu Val Pro Arg Leu Glu Glu Leu Ala Gly
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| Met | Leu | Asn | Glu | Ser | Glu | Glu | Phe | Thr | Pro | Glu | Ile | Asn | Val | Ala | Ser | | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | | |
| Glu | Val | Gly | Gly | Thr | Gln | Gly | Glu | Ser | Pro | Glu | Ser | Thr | Pro | Ser | Trp | | |
| | | | 20 | | | | | 25 | | | | | 30 | | | | |
| Gln | Gln | Arg | Leu | Thr | Gly | Leu | Thr | Glu | Ala | Glu | Gln | His | Thr | Ala | Leu | | |
| | | 35 | | | | | 40 | | | | | 45 | | | | | |
| Leu | Glu | Trp | Val | Ser | Ser | Leu | Ala | Ser | Ala | Ala | Leu | Arg | Asp | Ala | Ala | | |
| | 50 | | | | | 55 | | | | | 60 | | | | | | |
| Pro | Asp | Thr | Leu | Asp | Pro | His | Arg | Pro | Phe | Leu | Asp | Leu | Gly | Phe | Asp | | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | | |
| Ser | Leu | Ala | Ala | Val | Asp | Leu | His | Ala | Arg | Leu | Val | Ala | Gly | Thr | Gly | | |
| | | | | 85 | | | | | 90 | | | | | 95 | | | |
| Leu | Arg | Leu | Pro | Val | Thr | Leu | Ala | Phe | Asp | His | Pro | Thr | Pro | Ala | His | | |
| | | | 100 | | | | | 105 | | | | | 110 | | | | |
| Leu | Ala | Arg | His | Leu | His | Ala | Ala | Ile | Leu | Gly | Leu | Thr | Gly | Pro | Ala | | |
| | | 115 | | | | | 120 | | | | | 125 | | | | | |
| Glu | Thr | Pro | Val | Thr | Ala | Ala | Val | Gly | Ser | Asp | Glu | Pro | Ile | Ala | Ile | | |
| | 130 | | | | | 135 | | | | | 140 | | | | | | |
| Val | Gly | Ile | Gly | Cys | His | Phe | Pro | Gly | Gly | Val | Gln | Ser | Pro | Glu | Ala | | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | | |
| Leu | Trp | Asn | Leu | Val | Glu | Thr | Gly | Thr | Asp | Ala | Ile | Ser | Ala | Phe | Pro | | |
| | | | 165 | | | | | 170 | | | | | | 175 | | | |
| Thr | Gly | Arg | Gly | Trp | Asp | Leu | Asp | Ala | Leu | Tyr | Asp | Pro | Asp | Pro | Asp | | |
| | | | 180 | | | | | 185 | | | | | 190 | | | | |
| Arg | Ala | Gly | Thr | Ser | Tyr | Ala | Arg | Glu | Gly | Gly | Phe | Leu | His | Asp | Ala | | |
| | | 195 | | | | | 200 | | | | | 205 | | | | | |
| Asp | Ala | Phe | Asp | Ala | Ala | Phe | Phe | Gly | Ile | Ser | Pro | Arg | Glu | Ala | Leu | | |
| | 210 | | | | | 215 | | | | | 220 | | | | | | |
| Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | Leu | Leu | Glu | Ala | Ser | Trp | Glu | Ala | | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | | |
| Phe | Asp | Arg | Ala | Gly | Val | Asp | Pro | Ala | Ala | Leu | Arg | Gly | Gly | Gln | Val | | |
| | | | | 245 | | | | | 250 | | | | | 255 | | | |
| Gly | Val | Phe | Val | Gly | Ala | Glu | Thr | Gln | Glu | Tyr | Gly | Pro | Arg | Leu | Gln | | |
| | | | 260 | | | | | 265 | | | | | 270 | | | | |
| Asp | Ala | Thr | Asp | Gly | Phe | Glu | Gly | Tyr | Leu | Val | Thr | Gly | Asn | Ala | Ala | | |
| | | 275 | | | | | 280 | | | | | 285 | | | | | |
| Ser | Val | Ala | Ser | Gly | Arg | Ile | Ala | Tyr | Thr | Phe | Gly | Phe | Glu | Gly | Pro | | |
| | 290 | | | | | 295 | | | | | 300 | | | | | | |
| Thr | Val | Thr | Val | Asp | Thr | Ala | Cys | Ser | Ser | Ser | Leu | Ala | Ala | Leu | His | | |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 | | |

Leu Ala Val Gln Ala Leu Arg Thr Gly Glu Cys Ser Leu Ala Leu Ala
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 Gly Gly Val Ala Val Met Ala Ser Pro Gly Ser Phe Val Ser Phe Ser
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 Arg Gln Arg Gly Leu Ala Pro Asp Gly Arg Cys Lys Pro Phe Ala Ala
 355 360 365
 Ala Ala Asp Gly Thr Ala Trp Gly Glu Gly Val Gly Met Leu Leu Val
 370 375 380
 Glu Arg Leu Ser Asp Ala Arg Ala Lys Gly His Arg Ile Leu Ala Val
 385 390 395 400
 Val Arg Gly Ser Ala Ile Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr
 405 410 415
 Ala Pro Ser Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala
 420 425 430
 Asn Ala Gly Leu Ser Ala Ala Glu Val Asp Val Val Glu Ala His Gly
 435 440 445
 Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala
 450 455 460
 Thr Tyr Gly Gln Glu His Thr Asp Asp Arg Pro Leu Trp Leu Gly Ser
 465 470 475 480
 Leu Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly
 485 490 495
 Ile Ile Lys Met Ile Met Ala Met Arg His Gly Val Leu Pro Arg Thr
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 Leu His Val Asp Ala Pro Thr Pro His Val Asp Trp Glu Ala Gly Ala
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 Ser Thr Ala Pro Val Leu Leu Pro Trp Ala Leu Ser Ala Lys Thr Pro
 595 600 605
 Glu Ala Leu Arg Ala Gln Ala Arg Arg Leu Gly Thr Leu Ile Ala Ala
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 Gln Pro His Val Thr Pro Leu Asp Ile Gly His Ser Leu Ala Thr Thr
 625 630 635 640

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Gly | Arg | Phe | Glu | Gln | Arg | Ala | Ile | Val | Leu | Gly | Asp | Asp | Arg | Glu | 645 | 650 | 655 |
| Ala | Phe | Leu | Asp | Ala | Leu | His | Ala | Leu | Ala | Glu | Gly | Asn | Asp | Thr | Pro | 660 | 665 | 670 |
| Ser | Val | Val | Gln | Gly | Ala | Ala | Ala | Pro | Gly | Lys | Leu | Ala | Phe | Leu | Phe | 675 | 680 | 685 |
| Thr | Gly | Gln | Gly | Ser | Gln | Arg | Leu | Gly | Met | Gly | Arg | Glu | Leu | Tyr | Glu | 690 | 695 | 700 |
| Thr | His | Pro | Val | Phe | Ala | Asp | Ala | Leu | Asp | Asp | Ala | Cys | Trp | Tyr | Leu | 705 | 710 | 715 |
| Asp | Asp | Gln | Leu | Glu | Leu | Pro | Leu | Leu | Asp | Val | Leu | Phe | Ala | Asp | Glu | 725 | 730 | 735 |
| Gly | Ser | Pro | Glu | Ala | Ala | Leu | Leu | His | Gln | Thr | Ala | Tyr | Thr | Gln | Pro | 740 | 745 | 750 |
| Ala | Leu | Phe | Ala | Val | Glu | Val | Ala | Leu | Phe | Arg | Leu | Val | Asp | Ser | Trp | 755 | 760 | 765 |
| Gly | Leu | Lys | Pro | Asp | Phe | Val | Ala | Gly | His | Ser | Ile | Gly | Glu | Ile | Ala | 770 | 775 | 780 |
| Ala | Ala | His | Val | Ala | Gly | Val | Phe | Ser | Leu | Glu | Asp | Ala | Cys | Met | Leu | 785 | 790 | 795 |
| Val | Ala | Ala | Arg | Gly | Arg | Leu | Met | Gln | Ala | Leu | Pro | Ala | Gly | Gly | Val | 805 | 810 | 815 |
| Met | Ile | Ala | Leu | Gln | Ala | Ser | Glu | Asp | Glu | Val | Leu | Pro | Leu | Leu | Thr | 820 | 825 | 830 |
| Asp | Arg | Val | Ser | Ile | Ala | Ala | Ile | Asn | Gly | Pro | Gln | Ala | Val | Val | Ile | 835 | 840 | 845 |
| Ala | Gly | Asp | Glu | Asp | Ala | Ala | Ala | Ala | Ile | Ala | Glu | Thr | Phe | Gln | Ala | 850 | 855 | 860 |
| Ala | Gly | Arg | Lys | Thr | Lys | Arg | Leu | Thr | Val | Ser | His | Ala | Phe | His | Ser | 865 | 870 | 875 |
| Pro | His | Met | Asp | Ala | Met | Leu | Glu | Glu | Phe | Leu | Arg | Val | Ala | Gln | Val | 885 | 890 | 895 |
| Leu | Asp | Tyr | Ala | Lys | Pro | Thr | Leu | Pro | Val | Val | Ser | Leu | Leu | Thr | Gly | 900 | 905 | 910 |
| Thr | Thr | Ala | Thr | Pro | Ala | Glu | Leu | Ala | Thr | Pro | Ala | Tyr | Trp | Val | Arg | 915 | 920 | 925 |
| His | Val | Arg | Asp | Ala | Val | Arg | Tyr | Leu | Asp | Gly | Val | Arg | Thr | Leu | His | 930 | 935 | 940 |
| Gln | Arg | Gly | Val | Arg | Thr | Phe | Leu | Glu | Leu | Gly | Pro | Asp | Ala | Val | Leu | 945 | 950 | 955 |
| | | | | | | | | | | | | | | | | 960 | | |

Thr Ala Met Ala Gln Asp Cys Val Asp Pro Gln Gly Ala Ala Phe Ala
 965 970 975
 Pro Ala Leu Arg Ser Gly Arg Pro Glu Ala Ala Thr Val Leu Asn Ala
 980 985 990
 Val Ala His Ala His Val Arg Gly Ala Glu Thr Asp Trp Ala Ala Phe
 995 1000 1005
 Phe Ala Gly Thr Gly Ala Gln Arg Val Asp Leu Pro Thr Tyr Ala
 1010 1015 1020
 Phe Gln Arg Gln Arg Tyr Trp Met Asp Ser Arg Thr Pro Ala Pro
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 Asp Ser Ala Ala Gln Arg Ala His Gly Gly Ala Asp Pro Val Asp
 1040 1045 1050
 Arg Val Phe Trp Asp Ala Val Glu His Glu Asp Val Ala Thr Leu
 1055 1060 1065
 Ala Ala Ala Leu Glu Leu Asp Leu Asp Gly Glu Gln Pro Leu Ser
 1070 1075 1080
 Glu Val Val Pro Ala Leu Ser Ala Trp Arg Arg Arg Arg Arg Thr
 1085 1090 1095
 Gln Ser Glu Val Asp Gly Trp Arg Tyr Arg Val Thr Trp Lys Pro
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 Leu Thr Glu Val Ser Thr Ser Gly Leu Ser Gly Ser Trp Val Val
 1115 1120 1125
 Ile Ser Pro Ala Gly Gly Ala Asp Asp Ser Ala Val Val Ser Ala
 1130 1135 1140
 Leu Val Gly Arg Gly Val Asp Val Arg Arg Val Val Val Glu Ala
 1145 1150 1155
 Gly Val Asp Arg Ser Ala Leu Ala Gly Leu Leu Ala Glu Val Gly
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 Ser Pro Ser Gly Val Val Ser Leu Leu Gly Leu Asp Glu Ser Gly
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 Gly Leu Leu Gly Thr Val Gly Leu Val Gln Ala Leu Gly Asp Ala
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 Gly Val Gly Ala Pro Leu Trp Cys Leu Thr Arg Gly Ala Val Ser
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 Val Gly Arg Ser Asp Arg Leu Val Ser Pro Val Gln Ala Gln Val
 1220 1225 1230
 Trp Gly Leu Gly Arg Val Ala Ala Leu Glu Val Pro Glu Trp Trp
 1235 1240 1245
 Gly Gly Leu Ile Asp Leu Pro Glu Val Leu Asp Glu Arg Ala Val
 1250 1255 1260

| | | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|--|
| Ser | Arg | Leu | Val | Gly | Val | Leu | Ala | Gly | Ser | Gly | Glu | Asp | Gln | Val | |
| 1265 | | | | | | 1270 | | | | | 1275 | | | | |
| Ala | Val | Arg | Ser | Ser | Gly | Val | Phe | Gly | Arg | Arg | Leu | Val | Arg | Ala | |
| 1280 | | | | | | 1285 | | | | | 1290 | | | | |
| Pro | Arg | Ala | Glu | Gly | Ala | Ser | Ala | Trp | Ser | Pro | Thr | Gly | Thr | Val | |
| 1295 | | | | | | 1300 | | | | | 1305 | | | | |
| Leu | Val | Thr | Gly | Gly | Thr | Gly | Val | Leu | Gly | Gly | Arg | Val | Ala | Arg | |
| 1310 | | | | | | 1315 | | | | | 1320 | | | | |
| Trp | Leu | Ala | Gly | Ala | Gly | Ala | Glu | Arg | Leu | Val | Leu | Thr | Ser | Arg | |
| 1325 | | | | | | 1330 | | | | | 1335 | | | | |
| Arg | Gly | Leu | Asp | Ala | Pro | Gly | Ala | Val | Glu | Leu | Val | Glu | Glu | Leu | |
| 1340 | | | | | | 1345 | | | | | 1350 | | | | |
| Thr | Thr | Gly | Phe | Gly | Val | Glu | Val | Ser | Val | Val | Ala | Cys | Asp | Ala | |
| 1355 | | | | | | 1360 | | | | | 1365 | | | | |
| Ala | Asp | Arg | Asp | Ala | Leu | Arg | Ala | Leu | Leu | Ser | Ala | Glu | Ala | Gly | |
| 1370 | | | | | | 1375 | | | | | 1380 | | | | |
| Ser | Leu | Thr | Ala | Val | Val | His | Thr | Ala | Gly | Val | Leu | Asp | Asp | Gly | |
| 1385 | | | | | | 1390 | | | | | 1395 | | | | |
| Val | Leu | Asp | Ala | Leu | Thr | Pro | Asp | Arg | Ile | Asp | Ser | Val | Val | Arg | |
| 1400 | | | | | | 1405 | | | | | 1410 | | | | |
| Ala | Lys | Ala | Val | Ser | Ala | Leu | Asn | Leu | His | Glu | Leu | Thr | Ala | Glu | |
| 1415 | | | | | | 1420 | | | | | 1425 | | | | |
| Leu | Gly | Ile | Glu | Leu | Ser | Asp | Phe | Val | Leu | Phe | Ser | Ser | Val | Thr | |
| 1430 | | | | | | 1435 | | | | | 1440 | | | | |
| Gly | Thr | Val | Gly | Ala | Ala | Gly | Gln | Ala | Asn | Tyr | Ala | Ala | Ala | Asn | |
| 1445 | | | | | | 1450 | | | | | 1455 | | | | |
| Ala | Phe | Leu | Asp | Ala | Leu | Ala | Glu | Gln | Arg | Arg | Ala | Asp | Gly | Leu | |
| 1460 | | | | | | 1465 | | | | | 1470 | | | | |
| Ala | Ala | Thr | Ser | Ile | Ala | Trp | Gly | Pro | Trp | Ala | Glu | Gly | Gly | Met | |
| 1475 | | | | | | 1480 | | | | | 1485 | | | | |
| Ala | Ala | Asp | Glu | Ala | Met | Asp | Ala | Arg | Met | Arg | Arg | Glu | Gly | Met | |
| 1490 | | | | | | 1495 | | | | | 1500 | | | | |
| Pro | Pro | Met | Ala | Pro | Thr | Ser | Ala | Met | Ser | Ala | Leu | Glu | Gln | Ala | |
| 1505 | | | | | | 1510 | | | | | 1515 | | | | |
| Val | Gly | Ala | Gly | Glu | Thr | Ala | Leu | Thr | Val | Ala | Asp | Ile | Asp | Trp | |
| 1520 | | | | | | 1525 | | | | | 1530 | | | | |
| Glu | Arg | Phe | Ser | Ser | Val | Ile | Ala | Ala | Val | Arg | Pro | Asn | Pro | Leu | |
| 1535 | | | | | | 1540 | | | | | 1545 | | | | |
| Ile | Gly | Asp | Phe | Val | Val | Gly | Ala | Glu | Gly | Thr | Ala | Ala | Ala | Ser | |
| 1550 | | | | | | 1555 | | | | | 1560 | | | | |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Gly | His | Gly | Ser | Val | Val | Thr | Gly | Ala | Asp | Val | Ala | Ala | Thr | Val |
| 1565 | | | | | | 1570 | | | | | 1575 | | | |
| Ser | Gly | Arg | Leu | Ala | Gly | Leu | Thr | Gln | Ala | Glu | Gln | Glu | Arg | Glu |
| 1580 | | | | | | 1585 | | | | | 1590 | | | |
| Leu | Leu | Ser | Leu | Val | Arg | Leu | His | Val | Ala | Ala | Val | Leu | Gly | His |
| 1595 | | | | | | 1600 | | | | | 1605 | | | |
| Asp | Gly | Ser | Asp | Ala | Val | Gly | Ala | Glu | Arg | Ala | Phe | Lys | Glu | Leu |
| 1610 | | | | | | 1615 | | | | | 1620 | | | |
| Gly | Phe | Asp | Ser | Leu | Thr | Ser | Val | Glu | Leu | Arg | Asn | Arg | Leu | Gly |
| 1625 | | | | | | 1630 | | | | | 1635 | | | |
| Ala | Ala | Thr | Asp | Leu | Arg | Leu | Pro | Thr | Thr | Leu | Val | Tyr | Asp | Tyr |
| 1640 | | | | | | 1645 | | | | | 1650 | | | |
| Pro | Thr | Ser | Ala | Ala | Leu | Ala | Glu | Tyr | Leu | Arg | Gly | Glu | Leu | Ala |
| 1655 | | | | | | 1660 | | | | | 1665 | | | |
| Gly | Ser | Ala | Gln | Asp | Ala | Gly | Pro | Pro | Leu | Pro | Ala | Val | Val | Gly |
| 1670 | | | | | | 1675 | | | | | 1680 | | | |
| Ser | Ala | Ala | Asp | Asp | Asp | Pro | Ile | Val | Ile | Val | Ser | Met | Ser | Cys |
| 1685 | | | | | | 1690 | | | | | 1695 | | | |
| Arg | Phe | Pro | Gly | Gly | Val | Arg | Thr | Pro | Glu | Asp | Leu | Trp | Gln | Leu |
| 1700 | | | | | | 1705 | | | | | 1710 | | | |
| Leu | Ala | Asp | Gly | Thr | Asp | Thr | Val | Ala | Ala | Phe | Pro | Ala | Asp | Arg |
| 1715 | | | | | | 1720 | | | | | 1725 | | | |
| Gly | Trp | Asp | Leu | Asp | Gly | Leu | Tyr | Ser | Ala | Asp | Pro | Glu | Arg | Ser |
| 1730 | | | | | | 1735 | | | | | 1740 | | | |
| Gly | Thr | Ser | Tyr | Thr | Arg | Glu | Gly | Gly | Phe | Leu | Tyr | Asp | Ala | Ala |
| 1745 | | | | | | 1750 | | | | | 1755 | | | |
| Asp | Phe | Asp | Ala | Asp | Phe | Phe | Gly | Ile | Ser | Pro | Arg | Glu | Ala | Leu |
| 1760 | | | | | | 1765 | | | | | 1770 | | | |
| Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | Leu | Leu | Glu | Thr | Ala | Trp | Glu |
| 1775 | | | | | | 1780 | | | | | 1785 | | | |
| Thr | Phe | Glu | Arg | Ala | Gly | Ile | Asp | Pro | Ala | Ser | Leu | Arg | Gly | Ser |
| 1790 | | | | | | 1795 | | | | | 1800 | | | |
| Gln | Ala | Gly | Val | Phe | Val | Gly | Thr | Asn | Gly | Gln | Asp | Tyr | Leu | Ser |
| 1805 | | | | | | 1810 | | | | | 1815 | | | |
| Leu | Val | Thr | Arg | Glu | Gly | Asp | Gly | Leu | Asp | Gly | Leu | Glu | Gly | His |
| 1820 | | | | | | 1825 | | | | | 1830 | | | |
| Val | Gly | Thr | Gly | Asn | Ala | Ala | Ser | Val | Val | Ser | Gly | Arg | Leu | Ser |
| 1835 | | | | | | 1840 | | | | | 1845 | | | |
| Tyr | Val | Phe | Gly | Leu | Glu | Gly | Pro | Ala | Ile | Thr | Val | Asp | Thr | Ala |
| 1850 | | | | | | 1855 | | | | | 1860 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Cys | Ser | Ser | Ser | Leu | Val | Ala | Leu | His | Leu | Ala | Val | Gln | Ala | Leu |
| 1865 | | | | | | 1870 | | | | | 1875 | | | |
| Arg | Gln | Gly | Glu | Cys | Thr | Leu | Ala | Leu | Ala | Gly | Gly | Val | Thr | Val |
| 1880 | | | | | | 1885 | | | | | 1890 | | | |
| Met | Ser | Thr | Pro | Asp | Ala | Phe | Val | Asp | Phe | Ser | Arg | Gln | Arg | Gly |
| 1895 | | | | | | 1900 | | | | | 1905 | | | |
| Leu | Ala | Glu | Asp | Gly | Arg | Ile | Lys | Ala | Phe | Ala | Ser | Ala | Ala | Asp |
| 1910 | | | | | | 1915 | | | | | 1920 | | | |
| Gly | Thr | Gly | Trp | Gly | Glu | Gly | Val | Gly | Met | Leu | Leu | Val | Glu | Arg |
| 1925 | | | | | | 1930 | | | | | 1935 | | | |
| Leu | Ser | Asp | Ala | Arg | Arg | Asn | Gly | His | Pro | Val | Leu | Ala | Val | Val |
| 1940 | | | | | | 1945 | | | | | 1950 | | | |
| Arg | Gly | Ser | Ala | Ile | Asn | Gln | Asp | Gly | Ala | Ser | Asn | Gly | Leu | Thr |
| 1955 | | | | | | 1960 | | | | | 1965 | | | |
| Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln | Arg | Val | Ile | Arg | Gln | Ala | Leu |
| 1970 | | | | | | 1975 | | | | | 1980 | | | |
| Ala | Gly | Ala | Gly | Leu | Ser | Ala | Ala | Asp | Val | Asp | Ala | Val | Glu | Ala |
| 1985 | | | | | | 1990 | | | | | 1995 | | | |
| His | Gly | Thr | Gly | Thr | Arg | Leu | Gly | Asp | Pro | Ile | Glu | Ala | Gln | Ala |
| 2000 | | | | | | 2005 | | | | | 2010 | | | |
| Leu | Leu | Ala | Thr | Tyr | Gly | Gln | Gly | Arg | Pro | Ala | Asp | Arg | Pro | Leu |
| 2015 | | | | | | 2020 | | | | | 2025 | | | |
| Trp | Leu | Gly | Ser | Val | Lys | Ser | Asn | Ile | Gly | His | Thr | Gln | Ala | Ala |
| 2030 | | | | | | 2035 | | | | | 2040 | | | |
| Ala | Gly | Val | Ala | Gly | Val | Met | Lys | Met | Val | Met | Ala | Met | Arg | His |
| 2045 | | | | | | 2050 | | | | | 2055 | | | |
| Gly | Val | Leu | Pro | Arg | Thr | Leu | His | Val | Asp | Gly | Pro | Thr | Pro | His |
| 2060 | | | | | | 2065 | | | | | 2070 | | | |
| Val | Asp | Trp | Ser | Ala | Gly | Asp | Val | Ala | Leu | Leu | Thr | Glu | Gln | Arg |
| 2075 | | | | | | 2080 | | | | | 2085 | | | |
| Glu | Trp | Pro | Ala | Thr | Gly | His | Pro | Arg | Arg | Ala | Gly | Val | Ser | Ser |
| 2090 | | | | | | 2095 | | | | | 2100 | | | |
| Phe | Gly | Leu | Ser | Gly | Thr | Asn | Ala | His | Thr | Ile | Ile | Glu | Glu | Ala |
| 2105 | | | | | | 2110 | | | | | 2115 | | | |
| Pro | Ala | Asp | Asp | Asp | Ala | Glu | Pro | Thr | Thr | Gly | Ala | Gly | Thr | Ala |
| 2120 | | | | | | 2125 | | | | | 2130 | | | |
| Pro | Ser | Val | Leu | Pro | Leu | Leu | Ile | Ser | Ala | Lys | Ser | Asp | Ala | Gly |
| 2135 | | | | | | 2140 | | | | | 2145 | | | |
| Leu | Arg | Ala | Gln | Ser | Glu | Gln | Leu | Ala | Thr | His | Leu | Val | Gly | Asn |
| 2150 | | | | | | 2155 | | | | | 2160 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Pro | Asp | Val | Pro | Ile | Gly | Asp | Ile | Ala | Tyr | Ser | Leu | Thr | Thr | Gly |
| 2165 | | | | | | 2170 | | | | | 2175 | | | |
| Arg | Ser | Gly | Leu | Glu | Thr | Arg | Ala | Ile | Leu | Val | Gly | Asp | Ala | Asp |
| 2180 | | | | | | 2185 | | | | | 2190 | | | |
| Asn | Arg | Thr | Gly | Leu | Ala | Ala | Ala | Leu | Arg | Ser | Leu | Ala | Ala | Gly |
| 2195 | | | | | | 2200 | | | | | 2205 | | | |
| Glu | Gln | Ala | Pro | Gly | Leu | Val | Gln | Gly | Thr | Val | Thr | Glu | Gly | Gly |
| 2210 | | | | | | 2215 | | | | | 2220 | | | |
| Leu | Ala | Phe | Leu | Phe | Thr | Gly | Gln | Gly | Ser | Gln | Arg | Leu | Gly | Met |
| 2225 | | | | | | 2230 | | | | | 2235 | | | |
| Gly | Arg | Glu | Leu | Tyr | Glu | Thr | Tyr | Pro | Val | Phe | Ala | Asp | Ala | Leu |
| 2240 | | | | | | 2245 | | | | | 2250 | | | |
| Asp | Ala | Val | Cys | Ala | Arg | Met | Asp | Leu | Glu | Val | Pro | Leu | Arg | Asp |
| 2255 | | | | | | 2260 | | | | | 2265 | | | |
| Val | Leu | Phe | Gly | Ala | Tyr | Ala | Gly | Leu | Leu | Asp | Glu | Thr | Ala | Tyr |
| 2270 | | | | | | 2275 | | | | | 2280 | | | |
| Thr | Gln | Pro | Ala | Leu | Phe | Ala | Val | Glu | Val | Ala | Leu | Phe | Arg | Leu |
| 2285 | | | | | | 2290 | | | | | 2295 | | | |
| Val | Glu | Ser | Trp | Gly | Leu | Arg | Pro | Asp | Phe | Val | Ala | Gly | His | Ser |
| 2300 | | | | | | 2305 | | | | | 2310 | | | |
| Ile | Gly | Glu | Ile | Ala | Ala | Ala | His | Val | Ala | Gly | Val | Leu | Ser | Leu |
| 2315 | | | | | | 2320 | | | | | 2325 | | | |
| Asp | Asp | Ala | Cys | Ala | Leu | Val | Glu | Ala | Arg | Gly | Arg | Leu | Met | Gly |
| 2330 | | | | | | 2335 | | | | | 2340 | | | |
| Ala | Leu | Pro | Gly | Gly | Gly | Val | Met | Ile | Ala | Val | Gln | Ala | Pro | Glu |
| 2345 | | | | | | 2350 | | | | | 2355 | | | |
| Ala | Glu | Val | Leu | Pro | Leu | Leu | Thr | Glu | Arg | Val | Ser | Ile | Ala | Ala |
| 2360 | | | | | | 2365 | | | | | 2370 | | | |
| Ile | Asn | Gly | Pro | Gln | Ser | Val | Val | Ile | Ala | Gly | Asp | Glu | Ala | Asp |
| 2375 | | | | | | 2380 | | | | | 2385 | | | |
| Ala | Val | Ala | Ile | Val | Glu | Ser | Phe | Thr | Gly | Arg | Lys | Ser | Lys | Arg |
| 2390 | | | | | | 2395 | | | | | 2400 | | | |
| Leu | Thr | Val | Ser | His | Ala | Phe | His | Ser | Pro | His | Met | Asp | Gly | Met |
| 2405 | | | | | | 2410 | | | | | 2415 | | | |
| Leu | Glu | Asp | Phe | Arg | Ala | Val | Ala | Glu | Gly | Leu | Ser | Tyr | Glu | Ala |
| 2420 | | | | | | 2425 | | | | | 2430 | | | |
| Pro | Arg | Ile | Pro | Val | Val | Ser | Asn | Leu | Thr | Gly | Ala | Leu | Val | Ser |
| 2435 | | | | | | 2440 | | | | | 2445 | | | |
| Asp | Glu | Met | Gly | Ser | Ala | Glu | Phe | Trp | Val | Arg | His | Val | Arg | Glu |
| 2450 | | | | | | 2455 | | | | | 2460 | | | |

| | | | |
|---------|-----------------|---------------------|-----------------|
| Ala Val | Arg Phe Leu Asp | Gly Met Arg Val Leu | Glu Ala Ala Gly |
| 2465 | | 2470 | 2475 |
| Val Thr | Thr Tyr Val Glu | Leu Gly Pro Gly Gly | Val Leu Ser Ala |
| 2480 | | 2485 | 2490 |
| Leu Ala | Gln Glu Cys Val | Ser Gly Asp Gly Ala | Ala Phe Val Pro |
| 2495 | | 2500 | 2505 |
| Val Leu | Arg Ser Gly Arg | Pro Glu Ala Glu Thr | Ala Val Thr Ala |
| 2510 | | 2515 | 2520 |
| Leu Ala | Gln Ala His Val | Arg Gly Val Asp Val | Asp Trp Ala Ala |
| 2525 | | 2530 | 2535 |
| Phe Phe | Ser Gly Thr Gly | Val Gln Arg Val Asp | Leu Pro Thr Tyr |
| 2540 | | 2545 | 2550 |
| Ala Phe | Gln Arg Gln Arg | Phe Trp Pro Ala Met | Thr Ala Glu Ser |
| 2555 | | 2560 | 2565 |
| Ala Pro | Val Gly Gly Thr | Val Asp Ala Val Asp | Ala His Phe Trp |
| 2570 | | 2575 | 2580 |
| Asp Val | Ile Glu Gln Glu | Asp Val Glu Ser Leu | Ala Glu Leu Leu |
| 2585 | | 2590 | 2595 |
| Gly Leu | Asp Asp Ala Ser | Ala Trp Gly Ser Val | Val Pro Ala Leu |
| 2600 | | 2605 | 2610 |
| Ser Ala | Trp Arg Arg Gln | Gly Gln Gln Gln Ala | Gln Val Asp Gly |
| 2615 | | 2620 | 2625 |
| Trp Arg | Tyr Arg Ala Ser | Trp Lys Pro Val Thr | Ala Ala Val Ser |
| 2630 | | 2635 | 2640 |
| Ser Gly | Val Val Ser Gly | Thr Trp Val Val Ala | Val Pro Ala Gly |
| 2645 | | 2650 | 2655 |
| Ser Ala | Gly Asp Asp Ala | Arg Val Glu Ala Val | Thr Asn Gly Leu |
| 2660 | | 2665 | 2670 |
| Ala Gly | Arg Gly Val Asp | Val Arg Arg Val Val | Val Glu Ala Gly |
| 2675 | | 2680 | 2685 |
| Val Asp | Arg Ala Ala Leu | Ala Gly Leu Leu Ala | Gly Glu Gly Ser |
| 2690 | | 2695 | 2700 |
| Leu Ala | Gly Val Val Ser | Leu Leu Gly Leu Asp | Glu Ser Gly Gly |
| 2705 | | 2710 | 2715 |
| Leu Ala | Ala Thr Ala Gly | Leu Val Gln Ala Leu | Gly Asp Ala Gly |
| 2720 | | 2725 | 2730 |
| Val Ser | Ala Pro Leu Trp | Cys Leu Thr Arg Gly | Ala Val Ser Val |
| 2735 | | 2740 | 2745 |
| Gly Arg | Ser Asp Arg Leu | Val Ser Pro Val Gln | Ala Gln Val Trp |
| 2750 | | 2755 | 2760 |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Gly | Leu | Gly | Arg | Val | Ala | Ala | Leu | Glu | Val | Pro | Glu | Arg | Trp | Gly |
| 2765 | | | | | | 2770 | | | | | 2775 | | | |
| Gly | Leu | Val | Asp | Leu | Pro | Glu | Val | Leu | Asp | Glu | Arg | Ala | Val | Ser |
| 2780 | | | | | | 2785 | | | | | 2790 | | | |
| Arg | Leu | Ile | Gly | Val | Leu | Ala | Gly | Ser | Gly | Glu | Asp | Gln | Val | Ala |
| 2795 | | | | | | 2800 | | | | | 2805 | | | |
| Val | Arg | Ser | Ser | Gly | Val | Phe | Gly | Arg | Arg | Leu | Val | Arg | Ala | Pro |
| 2810 | | | | | | 2815 | | | | | 2820 | | | |
| Arg | Ala | Glu | Gly | Ala | Ala | Ser | Trp | Thr | Pro | Thr | Gly | Thr | Val | Leu |
| 2825 | | | | | | 2830 | | | | | 2835 | | | |
| Val | Thr | Gly | Gly | Thr | Gly | Val | Leu | Gly | Gly | Arg | Val | Ala | Arg | Trp |
| 2840 | | | | | | 2845 | | | | | 2850 | | | |
| Leu | Ala | Gly | Ala | Gly | Ala | Glu | Arg | Leu | Val | Leu | Thr | Ser | Arg | Arg |
| 2855 | | | | | | 2860 | | | | | 2865 | | | |
| Gly | Leu | Asp | Ala | Pro | Gly | Thr | Ala | Glu | Leu | Val | Glu | Glu | Leu | Thr |
| 2870 | | | | | | 2875 | | | | | 2880 | | | |
| Ser | Ser | Gly | Val | Glu | Val | Ser | Val | Val | Ala | Cys | Asp | Ala | Ala | Asp |
| 2885 | | | | | | 2890 | | | | | 2895 | | | |
| Arg | Asp | Ala | Leu | Arg | Ala | Leu | Leu | Ser | Ser | Glu | Ala | Gly | Ser | Leu |
| 2900 | | | | | | 2905 | | | | | 2910 | | | |
| Thr | Ala | Val | Ile | His | Thr | Ala | Gly | Val | Leu | Asp | Asp | Gly | Val | Leu |
| 2915 | | | | | | 2920 | | | | | 2925 | | | |
| Asp | Ala | Leu | Thr | Pro | Asp | Arg | Ile | Asp | Gly | Val | Val | Arg | Ala | Lys |
| 2930 | | | | | | 2935 | | | | | 2940 | | | |
| Ala | Val | Ser | Ala | Leu | Asn | Leu | His | Glu | Leu | Thr | Ala | Glu | Leu | Gly |
| 2945 | | | | | | 2950 | | | | | 2955 | | | |
| Ile | Glu | Leu | Ser | Ala | Phe | Val | Leu | Phe | Ser | Ser | Met | Ser | Gly | Thr |
| 2960 | | | | | | 2965 | | | | | 2970 | | | |
| Val | Gly | Thr | Ala | Gly | Gln | Ala | Asn | Tyr | Ala | Ala | Ala | Asn | Ala | Tyr |
| 2975 | | | | | | 2980 | | | | | 2985 | | | |
| Leu | Asp | Ala | Leu | Ala | Glu | Gln | Arg | Arg | Ala | Asp | Gly | Leu | Ala | Ala |
| 2990 | | | | | | 2995 | | | | | 3000 | | | |
| Thr | Ser | Ile | Ala | Trp | Gly | Pro | Trp | Ala | Glu | Gly | Gly | Met | Ala | Ala |
| 3005 | | | | | | 3010 | | | | | 3015 | | | |
| Asp | Ala | Ala | Leu | Glu | Ala | Arg | Met | Arg | Arg | Asp | Gly | Val | Pro | Pro |
| 3020 | | | | | | 3025 | | | | | 3030 | | | |
| Met | Pro | Ala | Asp | Pro | Ala | Ile | Arg | Ala | Leu | Arg | Gln | Ala | Val | Ala |
| 3035 | | | | | | 3040 | | | | | 3045 | | | |
| Gly | Asp | Asp | Ala | Val | Leu | Thr | Val | Ala | Asp | Val | Glu | Trp | Asp | Arg |
| 3050 | | | | | | 3055 | | | | | 3060 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Phe | Leu | Pro | Gly | Phe | Val | Ala | Ala | Arg | His | Ser | Glu | Leu | Phe | Ser |
| 3065 | | | | | | 3070 | | | | | 3075 | | | |
| Glu | Leu | Arg | Asp | Val | Arg | Asp | Ala | Arg | Ala | Ala | Gln | Asp | Arg | Ala |
| 3080 | | | | | | 3085 | | | | | 3090 | | | |
| Gln | Ala | Ala | Val | Ala | Ala | Asp | Arg | Pro | Asp | Ser | Leu | Ser | Gly | Arg |
| 3095 | | | | | | 3100 | | | | | 3105 | | | |
| Leu | Ser | Ala | Gln | Ala | Pro | Ala | Glu | Gln | Glu | Arg | Glu | Leu | Leu | Asp |
| 3110 | | | | | | 3115 | | | | | 3120 | | | |
| Leu | Val | Arg | Thr | Gln | Val | Ala | Ala | Val | Leu | Gly | His | Ala | Gly | Val |
| 3125 | | | | | | 3130 | | | | | 3135 | | | |
| Glu | Asn | Val | Gly | Ala | Gly | Arg | Ala | Phe | Lys | Glu | Leu | Gly | Phe | Asp |
| 3140 | | | | | | 3145 | | | | | 3150 | | | |
| Ser | Leu | Met | Ala | Val | Glu | Leu | Arg | Asn | Arg | Ile | Gly | Ser | Ala | Thr |
| 3155 | | | | | | 3160 | | | | | 3165 | | | |
| Glu | Leu | Arg | Leu | Pro | Ala | Thr | Leu | Ile | Tyr | Asp | His | Pro | Thr | Ser |
| 3170 | | | | | | 3175 | | | | | 3180 | | | |
| Ala | Ala | Leu | Ala | Glu | Phe | Leu | Arg | Gly | Glu | Leu | Val | Gly | Thr | Val |
| 3185 | | | | | | 3190 | | | | | 3195 | | | |
| Arg | Val | Ala | Asp | Lys | Val | Leu | Pro | Ala | Val | Val | Ser | Ala | Asp | Glu |
| 3200 | | | | | | 3205 | | | | | 3210 | | | |
| Asp | Pro | Ile | Ala | Ile | Val | Ser | Met | Ser | Cys | Arg | Phe | Pro | Gly | Gly |
| 3215 | | | | | | 3220 | | | | | 3225 | | | |
| Val | Arg | Thr | Pro | Glu | Asp | Leu | Trp | Arg | Leu | Leu | Val | Asp | Gly | Thr |
| 3230 | | | | | | 3235 | | | | | 3240 | | | |
| Asp | Ala | Val | Gly | Ala | Phe | Pro | Ala | Asp | Arg | Gly | Trp | Asp | Leu | Asp |
| 3245 | | | | | | 3250 | | | | | 3255 | | | |
| Arg | Leu | Tyr | Ser | Pro | Asp | Pro | Asp | Gln | Pro | Gly | Thr | Ser | Tyr | Thr |
| 3260 | | | | | | 3265 | | | | | 3270 | | | |
| Arg | Glu | Gly | Gly | Phe | Phe | Asp | Gly | Ala | Ala | Asp | Phe | Asp | Pro | Gly |
| 3275 | | | | | | 3280 | | | | | 3285 | | | |
| Phe | Phe | Gly | Ile | Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln |
| 3290 | | | | | | 3295 | | | | | 3300 | | | |
| Gln | Arg | Leu | Leu | Leu | Glu | Thr | Ser | Trp | Glu | Ala | Ile | Glu | Arg | Ala |
| 3305 | | | | | | 3310 | | | | | 3315 | | | |
| Gly | Ile | Asp | Pro | Ser | Ser | Leu | Arg | Gly | Ser | Gln | Ala | Gly | Val | Phe |
| 3320 | | | | | | 3325 | | | | | 3330 | | | |
| Val | Gly | Thr | Asn | Gly | Gln | Asp | Tyr | Leu | Ser | Leu | Ile | Thr | Arg | Glu |
| 3335 | | | | | | 3340 | | | | | 3345 | | | |
| Ser | Glu | Gly | Leu | Glu | Gly | His | Leu | Gly | Thr | Gly | Asn | Ala | Gly | Ser |
| 3350 | | | | | | 3355 | | | | | 3360 | | | |

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|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Val | Met | Ser | Gly | Arg | Val | Ser | Tyr | Val | Leu | Gly | Leu | Glu | Gly | Pro |
| | 3365 | | | | | 3370 | | | | | 3375 | | | |
| Ala | Val | Thr | Val | Asp | Thr | Ala | Cys | Ser | Ser | Ser | Leu | Val | Ala | Leu |
| | 3380 | | | | | 3385 | | | | | 3390 | | | |
| His | Trp | Ala | Ile | Gln | Ala | Leu | Arg | Gln | Gly | Glu | Cys | Ser | Met | Ala |
| | 3395 | | | | | 3400 | | | | | 3405 | | | |
| Leu | Ala | Gly | Gly | Val | Thr | Val | Met | Ser | Thr | Pro | Glu | Asn | Phe | Val |
| | 3410 | | | | | 3415 | | | | | 3420 | | | |
| Asp | Phe | Ser | Arg | Gln | Arg | Gly | Leu | Ala | Glu | Asp | Gly | Arg | Ile | Lys |
| | 3425 | | | | | 3430 | | | | | 3435 | | | |
| Ala | Phe | Ala | Ser | Ala | Ala | Asp | Gly | Thr | Gly | Trp | Gly | Glu | Gly | Val |
| | 3440 | | | | | 3445 | | | | | 3450 | | | |
| Gly | Met | Leu | Leu | Val | Glu | Arg | Leu | Ser | Asp | Ala | Arg | Arg | Asn | Gly |
| | 3455 | | | | | 3460 | | | | | 3465 | | | |
| His | Pro | Val | Leu | Ala | Val | Val | Arg | Gly | Ser | Ala | Val | Asn | Gln | Asp |
| | 3470 | | | | | 3475 | | | | | 3480 | | | |
| Gly | Ala | Ser | Asn | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln |
| | 3485 | | | | | 3490 | | | | | 3495 | | | |
| Arg | Val | Ile | Arg | Ala | Ala | Leu | Ala | Ser | Ala | Gly | Leu | Ser | Ala | Ala |
| | 3500 | | | | | 3505 | | | | | 3510 | | | |
| Asp | Val | Asp | Val | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Lys | Leu | Gly |
| | 3515 | | | | | 3520 | | | | | 3525 | | | |
| Asp | Pro | Ile | Glu | Ala | Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Gln | Asp |
| | 3530 | | | | | 3535 | | | | | 3540 | | | |
| Arg | Pro | Ala | Gly | Arg | Pro | Leu | Trp | Leu | Gly | Ser | Ile | Lys | Ser | Asn |
| | 3545 | | | | | 3550 | | | | | 3555 | | | |
| Ile | Gly | His | Thr | Gln | Ala | Ala | Ala | Gly | Val | Ala | Gly | Ile | Ile | Lys |
| | 3560 | | | | | 3565 | | | | | 3570 | | | |
| Met | Val | Leu | Ala | Met | Gln | His | Gly | Val | Leu | Pro | Gln | Thr | Leu | His |
| | 3575 | | | | | 3580 | | | | | 3585 | | | |
| Val | Asp | Glu | Pro | Thr | Pro | His | Val | Asp | Trp | Ser | Ala | Gly | Glu | Val |
| | 3590 | | | | | 3595 | | | | | 3600 | | | |
| Thr | Leu | Leu | Thr | Glu | Gln | Thr | Ala | Trp | Pro | Thr | Val | Asp | Arg | Pro |
| | 3605 | | | | | 3610 | | | | | 3615 | | | |
| Arg | Arg | Ala | Gly | Val | Ser | Ser | Phe | Gly | Ile | Ser | Gly | Thr | Asn | Ala |
| | 3620 | | | | | 3625 | | | | | 3630 | | | |
| His | Thr | Ile | Ile | Glu | Gln | Ala | Pro | Ala | Val | Glu | Gln | Leu | Ala | Asp |
| | 3635 | | | | | 3640 | | | | | 3645 | | | |
| Gly | Asp | Ala | Thr | Pro | Ala | Thr | Pro | Ala | Leu | Ala | Leu | Pro | Leu | Pro |
| | 3650 | | | | | 3655 | | | | | 3660 | | | |

| | | | | | | | | | | | | | | | |
|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|--|
| Tyr | Val | Leu | Ser | Ala | Lys | Ser | Pro | Glu | Ala | Leu | Arg | Ala | Gln | Ala | |
| | 3665 | | | | | 3670 | | | | | 3675 | | | | |
| Ser | Val | Leu | Arg | Thr | His | Leu | Glu | Ala | Thr | Asp | His | Asn | Gly | Pro | |
| | 3680 | | | | | 3685 | | | | | 3690 | | | | |
| Gly | Ser | Asp | Asp | Leu | Ala | Phe | Ser | Leu | Ala | Thr | Ala | Arg | Ala | His | |
| | 3695 | | | | | 3700 | | | | | 3705 | | | | |
| Leu | Glu | His | Arg | Ala | Val | Leu | Thr | Ala | Asp | Asp | Pro | Gln | Glu | Phe | |
| | 3710 | | | | | 3715 | | | | | 3720 | | | | |
| Arg | Glu | Ala | Leu | Ala | Arg | Leu | Ala | Asp | Gly | Asp | Pro | Ser | Pro | Arg | |
| | 3725 | | | | | 3730 | | | | | 3735 | | | | |
| Ile | Thr | Thr | Gly | Ala | Val | Ser | Asp | Gly | Arg | Thr | Ala | Phe | Leu | Phe | |
| | 3740 | | | | | 3745 | | | | | 3750 | | | | |
| Thr | Gly | Gln | Gly | Ser | Gln | Arg | Leu | Gly | Met | Gly | Arg | Glu | Leu | Tyr | |
| | 3755 | | | | | 3760 | | | | | 3765 | | | | |
| Glu | Ala | Tyr | Pro | Val | Phe | Ala | Asp | Ala | Leu | Asp | Ala | Val | Cys | Ala | |
| | 3770 | | | | | 3775 | | | | | 3780 | | | | |
| His | Val | Asp | Ala | His | Leu | Glu | Val | Pro | Leu | Lys | Asp | Val | Leu | Phe | |
| | 3785 | | | | | 3790 | | | | | 3795 | | | | |
| Gly | Ala | Asp | Ala | Gly | Leu | Leu | Asp | Gln | Thr | Ala | Tyr | Thr | Gln | Pro | |
| | 3800 | | | | | 3805 | | | | | 3810 | | | | |
| Ala | Leu | Phe | Ala | Val | Glu | Val | Ala | Leu | Phe | Arg | Leu | Val | Glu | Ser | |
| | 3815 | | | | | 3820 | | | | | 3825 | | | | |
| Trp | Gly | Val | Lys | Pro | Asp | Phe | Val | Ala | Gly | His | Ser | Ile | Gly | Glu | |
| | 3830 | | | | | 3835 | | | | | 3840 | | | | |
| Ile | Ala | Ala | Ala | His | Val | Ala | Gly | Val | Phe | Ser | Leu | Gln | Asp | Ala | |
| | 3845 | | | | | 3850 | | | | | 3855 | | | | |
| Ser | Glu | Leu | Val | Phe | Ala | Arg | Gly | Arg | Leu | Met | Gln | Ala | Leu | Pro | |
| | 3860 | | | | | 3865 | | | | | 3870 | | | | |
| Thr | Gly | Gly | Val | Met | Ile | Ala | Val | Gln | Ala | Ser | Glu | Asp | Glu | Val | |
| | 3875 | | | | | 3880 | | | | | 3885 | | | | |
| Leu | Pro | Leu | Leu | Thr | Asp | Arg | Val | Ser | Ile | Ala | Ala | Ile | Asn | Gly | |
| | 3890 | | | | | 3895 | | | | | 3900 | | | | |
| Pro | Gln | Ser | Val | Val | Ile | Ala | Gly | Asp | Glu | Ala | Asp | Ala | Val | Ala | |
| | 3905 | | | | | 3910 | | | | | 3915 | | | | |
| Ile | Ala | Glu | Ser | Phe | Thr | Asp | Arg | Lys | Ser | Lys | Arg | Leu | Thr | Val | |
| | 3920 | | | | | 3925 | | | | | 3930 | | | | |
| Ser | His | Ala | Phe | His | Ser | Pro | His | Met | Asp | Gly | Met | Leu | Asp | Ala | |
| | 3935 | | | | | 3940 | | | | | 3945 | | | | |
| Phe | Arg | Glu | Ile | Ala | Glu | Gly | Leu | Ser | Tyr | Glu | Pro | Ser | Arg | Ile | |
| | 3950 | | | | | 3955 | | | | | 3960 | | | | |

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| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Glu | Glu | Leu | Ala | Glu | Ala | Gly | Val | Ala | Tyr | Gly | Pro | Leu | Phe | Gln |
| 4265 | | | | | | 4270 | | | | | 4275 | | | |
| Gly | Leu | Lys | Ala | Ala | Trp | Arg | Arg | Asp | Gly | Glu | Leu | Phe | Thr | Glu |
| 4280 | | | | | | 4285 | | | | | 4290 | | | |
| Val | Ala | Leu | Pro | Gly | Glu | Ala | Arg | Arg | Glu | Ala | Ala | Arg | Phe | Gly |
| 4295 | | | | | | 4300 | | | | | 4305 | | | |
| Leu | His | Pro | Ala | Leu | Leu | Asp | Ala | Gly | Leu | His | Ala | Ile | Gly | His |
| 4310 | | | | | | 4315 | | | | | 4320 | | | |
| Gly | Glu | Gly | Pro | Glu | Pro | Ala | Met | Thr | Gly | Ala | Leu | Leu | Pro | Phe |
| 4325 | | | | | | 4330 | | | | | 4335 | | | |
| Ser | Trp | Ala | Gly | Val | Ser | Leu | Tyr | Ala | Ala | Gly | Ala | Ser | Ser | Leu |
| 4340 | | | | | | 4345 | | | | | 4350 | | | |
| Arg | Met | Arg | Leu | Thr | Pro | His | Thr | Pro | Asp | Asp | Ala | His | Thr | Met |
| 4355 | | | | | | 4360 | | | | | 4365 | | | |
| Ala | Leu | Leu | Val | Ala | Asp | Glu | Thr | Gly | Arg | Pro | Val | Ala | Ala | Val |
| 4370 | | | | | | 4375 | | | | | 4380 | | | |
| Glu | Ser | Leu | Ile | Leu | Arg | Thr | Ala | Ser | Ala | Asp | Gln | Val | Arg | Ala |
| 4385 | | | | | | 4390 | | | | | 4395 | | | |
| Ala | Asp | Gly | Gly | His | Leu | Asp | Ser | Leu | Phe | Lys | Val | Glu | Trp | Leu |
| 4400 | | | | | | 4405 | | | | | 4410 | | | |
| Pro | Val | Ala | Gly | Gly | Ala | Thr | Pro | His | Gly | Asp | Ser | Thr | Gly | Arg |
| 4415 | | | | | | 4420 | | | | | 4425 | | | |
| Arg | Trp | Ala | Val | Leu | Gly | Arg | Asp | Gly | Leu | Gly | Leu | Pro | Ala | Thr |
| 4430 | | | | | | 4435 | | | | | 4440 | | | |
| Gly | Val | Gln | Gly | Gln | Val | Ala | Glu | Tyr | Asp | Asp | Ala | Ser | Ala | Leu |
| 4445 | | | | | | 4450 | | | | | 4455 | | | |
| Gly | Ala | Ala | Leu | Ala | Ala | Gly | Glu | Pro | Val | Pro | Asp | Ala | Val | Phe |
| 4460 | | | | | | 4465 | | | | | 4470 | | | |
| Val | His | Pro | Gly | Ala | Leu | Pro | Gly | Gln | Asp | Thr | Asp | Thr | Thr | Ala |
| 4475 | | | | | | 4480 | | | | | 4485 | | | |
| Ala | Ser | Val | His | Ala | Ala | Val | Thr | Asp | Ala | Leu | Ser | Phe | Val | Gln |
| 4490 | | | | | | 4495 | | | | | 4500 | | | |
| Glu | Trp | Leu | Ala | Asp | Glu | Arg | Phe | Ala | Ala | Thr | Arg | Leu | Val | Trp |
| 4505 | | | | | | 4510 | | | | | 4515 | | | |
| Leu | Thr | Ser | Gly | Ala | Val | Ala | Asp | Glu | Pro | Gly | Ala | Gly | Val | Arg |
| 4520 | | | | | | 4525 | | | | | 4530 | | | |
| Asp | Leu | Ala | Gly | Ser | Ala | Val | Arg | Gly | Leu | Leu | Arg | Ser | Ala | Gln |
| 4535 | | | | | | 4540 | | | | | 4545 | | | |
| Ser | Glu | Asn | Pro | Gly | Gln | Leu | Leu | Met | Leu | Asp | Leu | Asp | Gln | Asp |
| 4550 | | | | | | 4555 | | | | | 4560 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|--|
| Pro | Ala | Ser | Leu | Ala | Ala | Leu | Pro | Ala | Ala | Leu | Ala | Ala | Gly | Glu | |
| 4565 | | | | | | 4570 | | | | | 4575 | | | | |
| Pro | Glu | Leu | Ala | Ile | Arg | Arg | Gly | Glu | Leu | Arg | Thr | Pro | Arg | Leu | |
| 4580 | | | | | | 4585 | | | | | 4590 | | | | |
| Thr | Arg | Val | Pro | Ser | Ala | Asp | Ala | Ala | Ala | Glu | Pro | Leu | Gly | Thr | |
| 4595 | | | | | | 4600 | | | | | 4605 | | | | |
| Leu | Gly | Asp | Pro | Ser | Gly | Thr | Val | Leu | Val | Thr | Gly | Ala | Thr | Gly | |
| 4610 | | | | | | 4615 | | | | | 4620 | | | | |
| Thr | Leu | Gly | Gly | Leu | Phe | Ala | Arg | His | Leu | Val | Thr | Ala | Tyr | Gly | |
| 4625 | | | | | | 4630 | | | | | 4635 | | | | |
| Val | Arg | Arg | Leu | Leu | Leu | Thr | Ser | Arg | Arg | Gly | Pro | Glu | Ala | Glu | |
| 4640 | | | | | | 4645 | | | | | 4650 | | | | |
| Gly | Ala | Ala | Glu | Leu | Val | Ala | Glu | Leu | Glu | Gln | Leu | Gly | Ala | His | |
| 4655 | | | | | | 4660 | | | | | 4665 | | | | |
| Val | Glu | Leu | Val | Ala | Cys | Asp | Ala | Ala | Asp | Arg | Ser | Ala | Leu | Ala | |
| 4670 | | | | | | 4675 | | | | | 4680 | | | | |
| Ala | Leu | Leu | Gly | Ala | Val | Pro | Ser | Glu | His | Pro | Leu | Thr | Ala | Val | |
| 4685 | | | | | | 4690 | | | | | 4695 | | | | |
| Val | His | Thr | Ala | Gly | Val | Leu | Asp | Asp | Gly | Ile | Leu | Ser | Ser | Leu | |
| 4700 | | | | | | 4705 | | | | | 4710 | | | | |
| Thr | Pro | Glu | Arg | Val | Ala | Ala | Val | Leu | Arg | Pro | Lys | Val | Asp | Ala | |
| 4715 | | | | | | 4720 | | | | | 4725 | | | | |
| Ala | Trp | Asn | Leu | His | Glu | Leu | Thr | Arg | Glu | Leu | Gly | Leu | Ser | Ala | |
| 4730 | | | | | | 4735 | | | | | 4740 | | | | |
| Phe | Val | Leu | Phe | Ser | Gly | Ala | Ala | Ala | Ala | Phe | Gly | Ala | Ala | Gly | |
| 4745 | | | | | | 4750 | | | | | 4755 | | | | |
| Gln | Gly | Asn | Tyr | Ala | Ala | Ala | Asn | Ser | Phe | Leu | Glu | Ala | Leu | Ala | |
| 4760 | | | | | | 4765 | | | | | 4770 | | | | |
| Glu | Gln | Arg | Arg | Ala | Glu | Gly | Leu | Pro | Ala | Thr | Ser | Leu | Ala | Trp | |
| 4775 | | | | | | 4780 | | | | | 4785 | | | | |
| Gly | Leu | Trp | Ala | Pro | Gln | Thr | Gly | Gly | Met | Ala | Gln | Gln | Leu | Asp | |
| 4790 | | | | | | 4795 | | | | | 4800 | | | | |
| Glu | Val | Asp | Leu | Arg | Arg | Ile | Ala | Arg | Asp | Gly | Val | Gly | Gly | Leu | |
| 4805 | | | | | | 4810 | | | | | 4815 | | | | |
| Ser | Gly | Asp | Glu | Gly | Leu | Gly | Leu | Phe | Asp | Thr | Ala | Met | Thr | Val | |
| 4820 | | | | | | 4825 | | | | | 4830 | | | | |
| Asp | Ala | Ala | Val | Leu | Leu | Pro | Met | Arg | Leu | Asp | Leu | Ala | Val | Ala | |
| 4835 | | | | | | 4840 | | | | | 4845 | | | | |
| Arg | Ala | Gln | Ala | Val | Ser | Thr | Gly | Glu | Thr | Pro | Ala | Leu | Leu | Arg | |
| 4850 | | | | | | 4855 | | | | | 4860 | | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Ala | Leu | Ile | Arg | Val | Pro | Ala | Arg | Arg | Ala | Val | Glu | Gln | Arg | Thr |
| 4865 | | | | | | 4870 | | | | | 4875 | | | |
| Ala | Ala | Asp | Gly | Ala | Ser | Pro | Leu | Ala | Ala | Arg | Leu | Ser | Ala | Leu |
| 4880 | | | | | | 4885 | | | | | 4890 | | | |
| Pro | Asp | Ala | Glu | Arg | Glu | Asp | Met | Leu | Leu | Asp | Leu | Val | Cys | Gly |
| 4895 | | | | | | 4900 | | | | | 4905 | | | |
| Arg | Val | Ala | Glu | Val | Leu | Gly | His | Thr | Asp | Ala | Arg | Ala | Val | Asp |
| 4910 | | | | | | 4915 | | | | | 4920 | | | |
| Ala | Asp | Arg | Ala | Phe | Lys | Glu | Leu | Gly | Phe | Asp | Ser | Leu | Thr | Ala |
| 4925 | | | | | | 4930 | | | | | 4935 | | | |
| Val | Glu | Leu | Arg | Asn | Val | Leu | Lys | Ala | Ala | Thr | Gly | Leu | Arg | Leu |
| 4940 | | | | | | 4945 | | | | | 4950 | | | |
| Ser | Pro | Thr | Leu | Val | Phe | Asp | Tyr | Pro | Thr | Pro | Val | Ala | Leu | Ala |
| 4955 | | | | | | 4960 | | | | | 4965 | | | |
| Arg | His | Leu | Leu | Ala | Glu | Leu | Ala | Gly | Thr | Ala | Asp | Asp | Gln | Asp |
| 4970 | | | | | | 4975 | | | | | 4980 | | | |
| Ala | Val | Arg | Gly | Arg | Lys | Ala | Pro | Ala | Arg | Pro | Ala | Thr | Ala | Ala |
| 4985 | | | | | | 4990 | | | | | 4995 | | | |
| Val | Thr | Ser | Val | Thr | Gly | Glu | Asp | Pro | Ile | Val | Ile | Val | Gly | Met |
| 5000 | | | | | | 5005 | | | | | 5010 | | | |
| Gly | Cys | Arg | Phe | Pro | Gly | Gly | Val | Arg | Ser | Pro | Glu | Asp | Leu | Trp |
| 5015 | | | | | | 5020 | | | | | 5025 | | | |
| Gln | Leu | Val | Ala | Thr | Gly | Gly | Asp | Gly | Ile | Thr | Gly | Phe | Pro | Ser |
| 5030 | | | | | | 5035 | | | | | 5040 | | | |
| Asp | Arg | Gly | Trp | Asn | Val | Glu | Ala | Leu | Tyr | His | Pro | Asp | Pro | Asp |
| 5045 | | | | | | 5050 | | | | | 5055 | | | |
| His | Ala | Gly | Thr | Ser | Tyr | Thr | Arg | Glu | Gly | Gly | Phe | Leu | His | Asp |
| 5060 | | | | | | 5065 | | | | | 5070 | | | |
| Ala | Ala | Asp | Phe | Asp | Pro | Gly | Phe | Phe | Gly | Ile | Ser | Pro | Arg | Glu |
| 5075 | | | | | | 5080 | | | | | 5085 | | | |
| Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | Leu | Leu | Glu | Thr | Ser |
| 5090 | | | | | | 5095 | | | | | 5100 | | | |
| Trp | Glu | Ala | Phe | Glu | Arg | Ala | Gly | Ile | Asp | Pro | Ala | Thr | Leu | Arg |
| 5105 | | | | | | 5110 | | | | | 5115 | | | |
| Gly | Ser | Arg | Thr | Gly | Val | Phe | Ala | Gly | Val | Met | Tyr | His | Asp | Tyr |
| 5120 | | | | | | 5125 | | | | | 5130 | | | |
| Val | Thr | Gly | Ile | Gly | Asp | Gly | Gly | Ser | Ala | Val | Glu | Leu | Pro | Glu |
| 5135 | | | | | | 5140 | | | | | 5145 | | | |
| Gly | Val | Glu | Gly | Tyr | Leu | Gly | Thr | Gly | Asn | Ala | Gly | Ser | Ile | Ala |
| 5150 | | | | | | 5155 | | | | | 5160 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Ser | Gly | Arg | Ile | Ala | Tyr | Thr | Phe | Gly | Leu | Glu | Gly | Pro | Ala | Val |
| 5165 | | | | | | 5170 | | | | | 5175 | | | |
| Thr | Val | Asp | Thr | Ala | Cys | Ser | Ser | Ser | Leu | Val | Ala | Leu | His | Trp |
| 5180 | | | | | | 5185 | | | | | 5190 | | | |
| Ala | Ile | Gln | Ala | Leu | Arg | Ser | Gly | Glu | Cys | Thr | Met | Ala | Leu | Ala |
| 5195 | | | | | | 5200 | | | | | 5205 | | | |
| Gly | Gly | Val | Ala | Val | Met | Ala | Thr | Pro | Glu | Thr | Phe | Val | Asp | Phe |
| 5210 | | | | | | 5215 | | | | | 5220 | | | |
| Ser | Arg | Gln | Arg | Gly | Leu | Ser | Ala | Asp | Gly | Arg | Cys | Lys | Ser | Phe |
| 5225 | | | | | | 5230 | | | | | 5235 | | | |
| Ala | Ala | Ala | Ala | Asp | Gly | Thr | Gly | Trp | Ala | Glu | Gly | Ala | Gly | Met |
| 5240 | | | | | | 5245 | | | | | 5250 | | | |
| Leu | Leu | Val | Glu | Arg | Leu | Ser | Asp | Ala | Glu | Arg | Asn | Gly | His | Pro |
| 5255 | | | | | | 5260 | | | | | 5265 | | | |
| Val | Leu | Ala | Val | Val | Arg | Gly | Ser | Ala | Ile | Asn | Gln | Asp | Gly | Ala |
| 5270 | | | | | | 5275 | | | | | 5280 | | | |
| Ser | Asn | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln | Arg | Val |
| 5285 | | | | | | 5290 | | | | | 5295 | | | |
| Ile | Arg | Glu | Ala | Leu | Ala | Ser | Ala | Asp | Leu | Ser | Ala | Ala | Asp | Ile |
| 5300 | | | | | | 5305 | | | | | 5310 | | | |
| Asp | Ala | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Arg | Leu | Gly | Asp | Pro |
| 5315 | | | | | | 5320 | | | | | 5325 | | | |
| Ile | Glu | Ala | Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Arg | Glu | Arg | Glu |
| 5330 | | | | | | 5335 | | | | | 5340 | | | |
| Ala | Gly | Arg | Pro | Leu | Trp | Leu | Gly | Ser | Ile | Lys | Ser | Asn | Ile | Gly |
| 5345 | | | | | | 5350 | | | | | 5355 | | | |
| His | Thr | Gln | Ala | Ala | Ala | Gly | Val | Ala | Gly | Ile | Ile | Lys | Met | Val |
| 5360 | | | | | | 5365 | | | | | 5370 | | | |
| Met | Ala | Met | Arg | His | Gly | Val | Leu | Pro | Gln | Thr | Leu | His | Val | Asp |
| 5375 | | | | | | 5380 | | | | | 5385 | | | |
| Glu | Pro | Ser | Pro | Gln | Val | Asp | Trp | Glu | Ala | Gly | Glu | Val | Ser | Leu |
| 5390 | | | | | | 5395 | | | | | 5400 | | | |
| Leu | Thr | Gly | Ala | Met | Pro | Trp | Pro | Gln | Thr | Gly | Arg | Pro | Arg | Arg |
| 5405 | | | | | | 5410 | | | | | 5415 | | | |
| Ala | Gly | Val | Ser | Ser | Phe | Gly | Ile | Ser | Gly | Thr | Asn | Ala | His | Thr |
| 5420 | | | | | | 5425 | | | | | 5430 | | | |
| Ile | Ile | Glu | Gln | Pro | Pro | Thr | Arg | Glu | Val | Thr | Pro | Thr | Val | Pro |
| 5435 | | | | | | 5440 | | | | | 5445 | | | |
| Val | Ala | Pro | Val | Val | Pro | Thr | Val | Pro | Thr | Val | Pro | Val | Val | Pro |
| 5450 | | | | | | 5455 | | | | | 5460 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|--|
| Trp | Val | Leu | Ser | Gly | Lys | Gly | Glu | Glu | Ala | Leu | Arg | Ala | Gln | Ala | |
| 5465 | | | | | | 5470 | | | | | 5475 | | | | |
| Arg | Gln | Leu | Gln | Ser | Tyr | Val | Leu | Arg | Ala | Pro | Glu | Leu | Arg | Pro | |
| 5480 | | | | | | 5485 | | | | | 5490 | | | | |
| Val | Asp | Ile | Ala | Gly | Ser | Leu | Ala | Val | Gly | Arg | Ala | Ser | Phe | Glu | |
| 5495 | | | | | | 5500 | | | | | 5505 | | | | |
| Asp | Arg | Ala | Ala | Val | Val | Ala | Ala | Asp | Arg | Glu | Gly | Leu | Leu | Ala | |
| 5510 | | | | | | 5515 | | | | | 5520 | | | | |
| Ala | Leu | Ala | Ala | Leu | Ala | Asp | Gly | Gly | Ser | Ala | Thr | Gly | Ala | Val | |
| 5525 | | | | | | 5530 | | | | | 5535 | | | | |
| Glu | Gly | Ser | Ala | Val | Gly | Gly | Lys | Leu | Ala | Phe | Leu | Phe | Thr | Gly | |
| 5540 | | | | | | 5545 | | | | | 5550 | | | | |
| Gln | Gly | Ser | Gln | Arg | Leu | Gly | Met | Gly | Arg | Glu | Leu | Tyr | Glu | Ala | |
| 5555 | | | | | | 5560 | | | | | 5565 | | | | |
| Tyr | Pro | Val | Phe | Ala | Glu | Ala | Leu | Asp | Ala | Val | Cys | Ala | Arg | Leu | |
| 5570 | | | | | | 5575 | | | | | 5580 | | | | |
| Glu | Leu | Pro | Leu | Lys | Asp | Val | Leu | Phe | Gly | Ala | Asp | Ala | Gly | Leu | |
| 5585 | | | | | | 5590 | | | | | 5595 | | | | |
| Leu | Asp | Glu | Thr | Ala | Tyr | Thr | Gln | Pro | Ala | Leu | Phe | Ala | Val | Glu | |
| 5600 | | | | | | 5605 | | | | | 5610 | | | | |
| Val | Ala | Leu | Phe | Arg | Leu | Val | Glu | Ser | Trp | Gly | Leu | Arg | Pro | Asp | |
| 5615 | | | | | | 5620 | | | | | 5625 | | | | |
| Phe | Val | Ala | Gly | His | Ser | Ile | Gly | Glu | Ile | Ala | Ala | Ala | His | Val | |
| 5630 | | | | | | 5635 | | | | | 5640 | | | | |
| Ala | Gly | Val | Phe | Ser | Leu | Asp | Asp | Ala | Cys | Ala | Leu | Val | Glu | Ala | |
| 5645 | | | | | | 5650 | | | | | 5655 | | | | |
| Arg | Gly | Arg | Leu | Met | Gly | Ala | Leu | Pro | Ala | Gly | Gly | Val | Met | Ile | |
| 5660 | | | | | | 5665 | | | | | 5670 | | | | |
| Ala | Val | Gln | Ala | Ser | Glu | Asp | Glu | Val | Leu | Pro | Leu | Leu | Thr | Asp | |
| 5675 | | | | | | 5680 | | | | | 5685 | | | | |
| Arg | Val | Ser | Ile | Ala | Ala | Ile | Asn | Gly | Pro | Arg | Ser | Val | Val | Ile | |
| 5690 | | | | | | 5695 | | | | | 5700 | | | | |
| Ala | Gly | Asp | Glu | Ala | Asp | Ala | Val | Ala | Ile | Val | Glu | Ser | Phe | Thr | |
| 5705 | | | | | | 5710 | | | | | 5715 | | | | |
| Gly | Arg | Lys | Ser | Lys | Arg | Leu | Thr | Val | Ser | His | Ala | Phe | His | Ser | |
| 5720 | | | | | | 5725 | | | | | 5730 | | | | |
| Pro | His | Met | Asp | Gly | Met | Leu | Glu | Asp | Phe | Arg | Ala | Val | Ala | Glu | |
| 5735 | | | | | | 5740 | | | | | 5745 | | | | |
| Gly | Leu | Ser | Tyr | Glu | Ala | Pro | Arg | Ile | Pro | Val | Val | Ser | Asn | Leu | |
| 5750 | | | | | | 5755 | | | | | 5760 | | | | |

| | | | | | |
|---------|-----------------|---------|-----------------|------|-------------|
| Thr Gly | Thr Leu Val | Thr Asp | Glu Met Gly Ser | Ala | Glu Phe Trp |
| 5765 | | 5770 | | 5775 | |
| Val Arg | His Val Arg Glu | Ala | Val Arg Phe Leu | Asp | Gly Ile Arg |
| 5780 | | 5785 | | 5790 | |
| Ala Leu | Glu Ala Ala Gly | Val | Thr Thr Tyr Val | Glu | Leu Gly Pro |
| 5795 | | 5800 | | 5805 | |
| Gly Gly | Val Leu Ser Ala | Leu | Ala Gln Glu Cys | Val | Ser Gly Asp |
| 5810 | | 5815 | | 5820 | |
| Gly Ala | Ala Phe Val Pro | Val | Leu Arg Ser Gly | Arg | Ser Glu Ala |
| 5825 | | 5830 | | 5835 | |
| Glu Thr | Ala Val Thr Ala | Leu | Ala Gln Ala His | Val | Arg Gly Val |
| 5840 | | 5845 | | 5850 | |
| Asn Val | Asp Trp Ala Ala | Phe | Phe Ala Gly Thr | Gly | Ala Glu Arg |
| 5855 | | 5860 | | 5865 | |
| Val Asp | Leu Pro Thr Tyr | Ala | Phe Gln Arg Gln | Arg | Tyr Trp Leu |
| 5870 | | 5875 | | 5880 | |
| His Ile | Pro Arg Val Ala | Gln | Ser Gly Val Ala | Asp | Glu Val Asp |
| 5885 | | 5890 | | 5895 | |
| Ala Arg | Phe Trp Asp Ala | Val | Glu Arg Glu Asp | Leu | Glu Ser Leu |
| 5900 | | 5905 | | 5910 | |
| Ala Ser | Thr Leu Glu Val | Asp | Asp Glu Ser Ala | Trp | Ser Ser Val |
| 5915 | | 5920 | | 5925 | |
| Leu Pro | Ala Leu Ser Ala | Trp | Arg Arg Glu Arg | Arg | Ala Gln Ser |
| 5930 | | 5935 | | 5940 | |
| Glu Val | Asp Gly Trp Arg | Tyr | Arg Val Ser Trp | Lys | Pro Leu Ala |
| 5945 | | 5950 | | 5955 | |
| Glu Val | Ser Ala Ser Gly | Leu | Ser Gly Ser Trp | Val | Val Ile Ser |
| 5960 | | 5965 | | 5970 | |
| Pro Ala | Gly Ser Val Asp | Asp | Ser Ala Val Val | Ser | Ala Leu Val |
| 5975 | | 5980 | | 5985 | |
| Gly Arg | Gly Ala Glu Val | Arg | Arg Val Val Val | Glu | Ala Gly Val |
| 5990 | | 5995 | | 6000 | |
| Asp Arg | Ser Ala Leu Ala | Gly | Leu Leu Ala Asp | Ala | Gly Ser Ala |
| 6005 | | 6010 | | 6015 | |
| Ala Gly | Val Val Ser Leu | Leu | Gly Leu Asp Glu | Ser | Glu Gly Leu |
| 6020 | | 6025 | | 6030 | |
| Leu Gly | Thr Val Gly Leu | Val | Gln Ala Leu Gly | Asp | Ala Gly Val |
| 6035 | | 6040 | | 6045 | |
| Glu Ala | Pro Leu Trp Cys | Leu | Thr Arg Gly Ala | Val | Ser Val Gly |
| 6050 | | 6055 | | 6060 | |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Arg | Ser | Asp | Arg | Leu | Val | Ser | Pro | Val | Gln | Ala | Gln | Val | Trp | Gly |
| 6065 | | | | | | 6070 | | | | | 6075 | | | |
| Leu | Gly | Arg | Val | Ala | Ala | Leu | Glu | Val | Pro | Glu | Arg | Trp | Gly | Gly |
| 6080 | | | | | | 6085 | | | | | 6090 | | | |
| Leu | Val | Asp | Leu | Pro | Glu | Val | Leu | Asp | Glu | Arg | Ala | Val | Ala | Arg |
| 6095 | | | | | | 6100 | | | | | 6105 | | | |
| Leu | Val | Gly | Val | Leu | Ala | Gly | Ser | Gly | Glu | Asp | Gln | Val | Ala | Val |
| 6110 | | | | | | 6115 | | | | | 6120 | | | |
| Arg | Ser | Ser | Gly | Val | Phe | Gly | Arg | Arg | Leu | Val | Arg | Ala | Pro | Arg |
| 6125 | | | | | | 6130 | | | | | 6135 | | | |
| Ala | Glu | Gly | Ala | Ser | Ala | Trp | Thr | Pro | Thr | Gly | Thr | Val | Leu | Val |
| 6140 | | | | | | 6145 | | | | | 6150 | | | |
| Thr | Gly | Gly | Thr | Gly | Val | Leu | Gly | Gly | Arg | Val | Ala | Arg | Trp | Leu |
| 6155 | | | | | | 6160 | | | | | 6165 | | | |
| Ala | Gly | Ala | Gly | Ala | Glu | Arg | Leu | Val | Leu | Thr | Ser | Arg | Arg | Gly |
| 6170 | | | | | | 6175 | | | | | 6180 | | | |
| Pro | Asp | Ala | Pro | Gly | Ala | Ala | Glu | Leu | Val | Glu | Glu | Leu | Thr | Thr |
| 6185 | | | | | | 6190 | | | | | 6195 | | | |
| Gly | Phe | Gly | Val | Glu | Val | Ser | Val | Val | Ala | Cys | Asp | Ala | Ala | Asp |
| 6200 | | | | | | 6205 | | | | | 6210 | | | |
| Arg | Asp | Ala | Leu | Arg | Thr | Leu | Leu | Ser | Ala | Glu | Ala | Gly | Thr | Leu |
| 6215 | | | | | | 6220 | | | | | 6225 | | | |
| Thr | Ala | Val | Ile | His | Thr | Ala | Gly | Val | Leu | Asp | Asp | Gly | Val | Leu |
| 6230 | | | | | | 6235 | | | | | 6240 | | | |
| Asp | Ala | Leu | Thr | Pro | Asp | Arg | Ile | Asp | Ser | Val | Leu | Arg | Ala | Lys |
| 6245 | | | | | | 6250 | | | | | 6255 | | | |
| Ala | Val | Ser | Ala | Phe | Asn | Leu | His | Glu | Leu | Thr | Ala | Glu | Leu | Gly |
| 6260 | | | | | | 6265 | | | | | 6270 | | | |
| Ile | Glu | Leu | Ser | Ala | Phe | Val | Leu | Phe | Ser | Ser | Met | Ser | Gly | Thr |
| 6275 | | | | | | 6280 | | | | | 6285 | | | |
| Val | Gly | Ala | Ala | Gly | Gln | Ala | Asn | Tyr | Ala | Ala | Ala | Asn | Ala | Tyr |
| 6290 | | | | | | 6295 | | | | | 6300 | | | |
| Leu | Asp | Ala | Leu | Ala | Glu | Gln | Arg | Arg | Ala | Asp | Gly | Leu | Ala | Ala |
| 6305 | | | | | | 6310 | | | | | 6315 | | | |
| Thr | Ser | Leu | Ala | Trp | Gly | Pro | Trp | Ala | Glu | Gly | Gly | Met | Ala | Gly |
| 6320 | | | | | | 6325 | | | | | 6330 | | | |
| Asp | Asp | Ala | Met | Asp | Ala | Arg | Met | Arg | Arg | Glu | Gly | Leu | Pro | Pro |
| 6335 | | | | | | 6340 | | | | | 6345 | | | |
| Met | Ala | Pro | Asp | Ala | Ala | Leu | Thr | Leu | Leu | Arg | Gln | Ser | Val | Gly |
| 6350 | | | | | | 6355 | | | | | 6360 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Ser | Ala | Asp | Ala | Ala | Leu | Met | Val | Val | Asp | Val | Glu | Trp | Gln | Arg |
| 6365 | | | | | | 6370 | | | | | 6375 | | | |
| Phe | Ala | Pro | Ala | Leu | Thr | Val | Val | Arg | Pro | Ser | Asn | Leu | Leu | Ala |
| 6380 | | | | | | 6385 | | | | | 6390 | | | |
| Glu | Leu | Pro | Glu | Ala | Arg | Pro | Ala | Gly | Thr | Asp | Ser | Arg | Thr | Gly |
| 6395 | | | | | | 6400 | | | | | 6405 | | | |
| Gly | Ala | Thr | Ser | Ser | Glu | Gly | Ala | Gly | Ser | Phe | Ala | Glu | Arg | Leu |
| 6410 | | | | | | 6415 | | | | | 6420 | | | |
| Ala | Ala | Leu | Gly | Gly | Ala | Glu | Gln | Asp | Lys | Glu | Leu | Leu | Asn | Leu |
| 6425 | | | | | | 6430 | | | | | 6435 | | | |
| Val | Arg | Thr | His | Ile | Ala | Ala | Val | Leu | Gly | His | Gly | Gly | Ser | Glu |
| 6440 | | | | | | 6445 | | | | | 6450 | | | |
| Ala | Val | Gly | Ala | Glu | Arg | Ala | Phe | Lys | Glu | Leu | Gly | Phe | Asp | Ser |
| 6455 | | | | | | 6460 | | | | | 6465 | | | |
| Leu | Thr | Ala | Val | Glu | Leu | Arg | Asn | Arg | Leu | Gly | Ala | Ala | Thr | Gly |
| 6470 | | | | | | 6475 | | | | | 6480 | | | |
| Val | Arg | Leu | Pro | Ala | Thr | Leu | Ile | Phe | Asp | Tyr | Pro | Thr | Ala | Thr |
| 6485 | | | | | | 6490 | | | | | 6495 | | | |
| Ala | Leu | Ala | Ala | Tyr | Leu | Arg | Gly | Glu | Leu | Leu | Gly | Thr | Gln | Val |
| 6500 | | | | | | 6505 | | | | | 6510 | | | |
| Val | Val | Ser | Gly | Pro | Val | Ser | Asn | Gly | Val | Val | Val | Asp | Asp | Asp |
| 6515 | | | | | | 6520 | | | | | 6525 | | | |
| Pro | Ile | Ala | Ile | Val | Ala | Met | Ser | Cys | Arg | Phe | Pro | Gly | Gly | Val |
| 6530 | | | | | | 6535 | | | | | 6540 | | | |
| Arg | Thr | Pro | Glu | Asp | Leu | Trp | Arg | Leu | Leu | Ser | Thr | Gly | Gly | Asp |
| 6545 | | | | | | 6550 | | | | | 6555 | | | |
| Ala | Ile | Gly | Glu | Phe | Pro | Ala | Asp | Arg | Gly | Trp | Asp | Leu | Ser | Arg |
| 6560 | | | | | | 6565 | | | | | 6570 | | | |
| Leu | Tyr | Ser | Pro | Asp | Pro | Asp | Lys | Gln | Gly | Thr | Phe | Tyr | Ala | Arg |
| 6575 | | | | | | 6580 | | | | | 6585 | | | |
| Ala | Gly | Gly | Phe | Leu | Tyr | Asp | Ala | Ala | Asp | Phe | Asp | Ala | Asp | Phe |
| 6590 | | | | | | 6595 | | | | | 6600 | | | |
| Phe | Gly | Ile | Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln |
| 6605 | | | | | | 6610 | | | | | 6615 | | | |
| Arg | Leu | Leu | Leu | Glu | Thr | Ser | Trp | Glu | Ala | Phe | Glu | Arg | Ala | Gly |
| 6620 | | | | | | 6625 | | | | | 6630 | | | |
| Ile | Asp | Pro | Ser | Ser | Leu | Arg | Gly | Ser | Gln | Ala | Gly | Val | Phe | Val |
| 6635 | | | | | | 6640 | | | | | 6645 | | | |
| Gly | Thr | Asn | Gly | Gln | Asp | Tyr | Gly | Ala | Met | Leu | Gln | Thr | Ile | Pro |
| 6650 | | | | | | 6655 | | | | | 6660 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Asp | Gly | Ile | Glu | Gly | Phe | Leu | Gly | Thr | Gly | Asn | Ala | Ala | Ser | Val |
| 6665 | | | | | | 6670 | | | | | 6675 | | | |
| Val | Ser | Gly | Arg | Leu | Ser | Tyr | Ala | Phe | Gly | Leu | Glu | Gly | Pro | Ala |
| 6680 | | | | | | 6685 | | | | | 6690 | | | |
| Val | Thr | Val | Asp | Thr | Ala | Cys | Ser | Ala | Ser | Leu | Val | Ala | Leu | His |
| 6695 | | | | | | 6700 | | | | | 6705 | | | |
| Trp | Ala | Val | Gln | Ala | Leu | Arg | Ser | Gly | Glu | Cys | Ser | Leu | Ala | Leu |
| 6710 | | | | | | 6715 | | | | | 6720 | | | |
| Ala | Gly | Gly | Val | Thr | Val | Met | Ser | Ser | Pro | Gly | Ala | Tyr | Ile | Asp |
| 6725 | | | | | | 6730 | | | | | 6735 | | | |
| Phe | Ser | Arg | Gln | Arg | Gly | Leu | Ala | Glu | Asp | Gly | Arg | Ile | Lys | Ala |
| 6740 | | | | | | 6745 | | | | | 6750 | | | |
| Phe | Ala | Ala | Ala | Ala | Asp | Gly | Thr | Gly | Trp | Gly | Glu | Gly | Val | Gly |
| 6755 | | | | | | 6760 | | | | | 6765 | | | |
| Met | Leu | Leu | Val | Glu | Arg | Leu | Ser | Asp | Ala | Arg | Arg | Asn | Gly | His |
| 6770 | | | | | | 6775 | | | | | 6780 | | | |
| Pro | Val | Leu | Ala | Leu | Val | Arg | Gly | Ser | Ala | Ile | Asn | Gln | Asp | Gly |
| 6785 | | | | | | 6790 | | | | | 6795 | | | |
| Ala | Ser | Asn | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln | Arg |
| 6800 | | | | | | 6805 | | | | | 6810 | | | |
| Val | Ile | Arg | Gln | Ala | Leu | Ala | Asn | Ala | Gly | Leu | Ser | Ala | Ala | Glu |
| 6815 | | | | | | 6820 | | | | | 6825 | | | |
| Val | Asp | Ala | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Arg | Leu | Gly | Asp |
| 6830 | | | | | | 6835 | | | | | 6840 | | | |
| Pro | Ile | Glu | Val | Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Arg | Glu | Arg |
| 6845 | | | | | | 6850 | | | | | 6855 | | | |
| Glu | Ala | Asp | Gln | Pro | Leu | Trp | Leu | Gly | Ser | Ile | Lys | Ser | Asn | Ile |
| 6860 | | | | | | 6865 | | | | | 6870 | | | |
| Gly | His | Thr | Gln | Ala | Ala | Ala | Gly | Val | Ala | Gly | Val | Ile | Lys | Met |
| 6875 | | | | | | 6880 | | | | | 6885 | | | |
| Val | Leu | Ala | Met | Glu | His | Gly | Val | Leu | Pro | Gln | Thr | Leu | His | Val |
| 6890 | | | | | | 6895 | | | | | 6900 | | | |
| Asp | Glu | Pro | Thr | Pro | His | Val | Asp | Trp | Ser | Ala | Gly | Asp | Val | Ala |
| 6905 | | | | | | 6910 | | | | | 6915 | | | |
| Leu | Leu | Thr | Asp | Ala | Val | Glu | Trp | Pro | Glu | Thr | Gly | Arg | Pro | Arg |
| 6920 | | | | | | 6925 | | | | | 6930 | | | |
| Arg | Ala | Gly | Val | Ser | Ser | Phe | Gly | Phe | Ser | Gly | Thr | Asn | Ala | His |
| 6935 | | | | | | 6940 | | | | | 6945 | | | |
| Thr | Val | Leu | Glu | Gln | Ala | Pro | Lys | Pro | Glu | Glu | Pro | Glu | Glu | Ser |
| 6950 | | | | | | 6955 | | | | | 6960 | | | |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Gln | Gln | Pro | Glu | Glu | Thr | Asn | Ala | Pro | Ala | Arg | Pro | His | Gln | Ser |
| 6965 | | | | | | 6970 | | | | | 6975 | | | |
| Gly | Val | Met | Pro | Trp | Thr | Leu | Ser | Ala | Lys | Ser | Glu | Ala | Ala | Leu |
| 6980 | | | | | | 6985 | | | | | 6990 | | | |
| Arg | Val | Gln | Ala | Glu | Arg | Leu | Arg | Thr | Arg | Ile | Ala | Ser | Asp | Pro |
| 6995 | | | | | | 7000 | | | | | 7005 | | | |
| Leu | Leu | Gln | Pro | Val | Asp | Val | Ala | Tyr | Ser | Leu | Ala | Thr | Ser | Arg |
| 7010 | | | | | | 7015 | | | | | 7020 | | | |
| Ala | Ala | Leu | Glu | Arg | Arg | Ala | Val | Val | Val | Ala | Thr | Glu | Arg | Asp |
| 7025 | | | | | | 7030 | | | | | 7035 | | | |
| Glu | Phe | Leu | Ala | Gly | Leu | Lys | Ala | Leu | Ala | Ser | Gly | Gln | Pro | Ala |
| 7040 | | | | | | 7045 | | | | | 7050 | | | |
| Pro | Gly | Leu | Val | Gln | Gly | Arg | Val | Thr | Glu | Gly | Gly | Leu | Ala | Phe |
| 7055 | | | | | | 7060 | | | | | 7065 | | | |
| Leu | Phe | Thr | Gly | Gln | Gly | Ser | Gln | Arg | Leu | Gly | Met | Gly | Arg | Glu |
| 7070 | | | | | | 7075 | | | | | 7080 | | | |
| Leu | Tyr | Glu | Thr | Tyr | Pro | Val | Phe | Ala | Asp | Ala | Leu | Asp | Ala | Val |
| 7085 | | | | | | 7090 | | | | | 7095 | | | |
| Cys | Val | Arg | Leu | Glu | Leu | Pro | Leu | Met | Asp | Val | Leu | Phe | Gly | Thr |
| 7100 | | | | | | 7105 | | | | | 7110 | | | |
| Glu | Arg | Asp | Ala | Leu | Asp | Glu | Thr | Gly | Tyr | Thr | Gln | Pro | Ala | Leu |
| 7115 | | | | | | 7120 | | | | | 7125 | | | |
| Phe | Ala | Val | Glu | Val | Ala | Leu | Phe | Arg | Leu | Val | Glu | Ser | Trp | Gly |
| 7130 | | | | | | 7135 | | | | | 7140 | | | |
| Val | Arg | Pro | Asp | Phe | Leu | Ala | Gly | His | Ser | Ile | Gly | Glu | Ile | Ala |
| 7145 | | | | | | 7150 | | | | | 7155 | | | |
| Ala | Ala | His | Val | Ala | Gly | Val | Phe | Ser | Leu | Asp | Asp | Ala | Cys | Ala |
| 7160 | | | | | | 7165 | | | | | 7170 | | | |
| Leu | Val | Glu | Ala | Arg | Gly | Arg | Leu | Met | Gln | Ala | Leu | Pro | Thr | Gly |
| 7175 | | | | | | 7180 | | | | | 7185 | | | |
| Gly | Val | Met | Ile | Ala | Val | Gln | Ala | Ser | Glu | Ala | Glu | Val | Leu | Pro |
| 7190 | | | | | | 7195 | | | | | 7200 | | | |
| Leu | Leu | Thr | Glu | Arg | Val | Ser | Ile | Ala | Ala | Ile | Asn | Gly | Pro | Gln |
| 7205 | | | | | | 7210 | | | | | 7215 | | | |
| Ser | Val | Val | Ile | Ala | Gly | Asp | Glu | Ala | Asp | Ala | Val | Ala | Leu | Val |
| 7220 | | | | | | 7225 | | | | | 7230 | | | |
| Glu | Ser | Phe | Thr | Gly | Arg | Lys | Ser | Lys | Arg | Leu | Thr | Val | Ser | His |
| 7235 | | | | | | 7240 | | | | | 7245 | | | |
| Ala | Phe | His | Ser | Pro | His | Met | Asp | Gly | Met | Leu | Ala | Asp | Phe | Arg |
| 7250 | | | | | | 7255 | | | | | 7260 | | | |

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|---------|---------------------|---------------------|-------------|
| Lys Val | Ala Glu Gly Leu Ser | Tyr Glu Ala Pro Arg | Ile Pro Val |
| 7265 | 7270 | 7275 | |
| Val Ser | Asn Leu Thr Gly Ala | Leu Val Thr Asp Glu | Met Gly Ser |
| 7280 | 7285 | 7290 | |
| Ala Asp | Phe Trp Val Arg His | Val Arg Glu Ala Val | Arg Phe Leu |
| 7295 | 7300 | 7305 | |
| Asp Gly | Thr Arg Thr Leu Glu | Ala Leu Gly Val Thr | Thr Tyr Val |
| 7310 | 7315 | 7320 | |
| Glu Leu | Gly Pro Asp Gly Val | Leu Ser Ala Met Ala | Gln Glu Cys |
| 7325 | 7330 | 7335 | |
| Val Thr | Gly Glu Asp Ser Val | Phe Val Pro Val Leu | Arg Ser Gly |
| 7340 | 7345 | 7350 | |
| Arg Pro | Glu Ala Glu Ser Val | Thr Thr Ala Leu Ala | Gln Val His |
| 7355 | 7360 | 7365 | |
| Val Arg | Gly Ile Ala Val Asp | Trp Gln Ala Tyr Phe | Ala Gly Thr |
| 7370 | 7375 | 7380 | |
| Gly Ala | Gln Arg Val Asp Leu | Pro Thr Tyr Ala Phe | Gln Arg Arg |
| 7385 | 7390 | 7395 | |
| Arg Tyr | Trp Leu Glu Glu Ala | Pro Ala Thr Ala Ala | Val Glu Pro |
| 7400 | 7405 | 7410 | |
| Leu Thr | Gly Ser Leu Gly Ala | Val Asp Ala Gln Phe | Trp Ala Ala |
| 7415 | 7420 | 7425 | |
| Val Asp | Asn Ala Asp Leu Ser | Ala Leu Thr Ala Thr | Leu Asp Ile |
| 7430 | 7435 | 7440 | |
| Asp Val | Asp Ala Asp Gln Pro | Leu Ser Ala Leu Leu | Pro Ala Leu |
| 7445 | 7450 | 7455 | |
| Ser Ala | Trp Arg Arg Gln Arg | Gln Glu Gln Ser Val | Val Asp Gly |
| 7460 | 7465 | 7470 | |
| Trp Arg | Tyr Thr Val Thr Trp | Lys Pro Met Ala Asp | Pro Ala Val |
| 7475 | 7480 | 7485 | |
| Ala Arg | Pro Thr Gly Thr Trp | Leu Val Val Thr Pro | Ala Thr Ser |
| 7490 | 7495 | 7500 | |
| Leu Val | Asp Leu Pro Ala Val | Ser Ala Ala Leu Ala | Ala Gln Gly |
| 7505 | 7510 | 7515 | |
| Val Asp | Val Arg Glu Val Ala | Leu Glu Ala Ala Glu | Leu Asp Arg |
| 7520 | 7525 | 7530 | |
| Asp Gly | Val Ala Gly Arg Met | Arg Glu Ala Leu Ala | Gly Asp Arg |
| 7535 | 7540 | 7545 | |
| Ala Asp | Gly Val Leu Ser Leu | Leu Ala Leu Ala Glu | His Pro His |
| 7550 | 7555 | 7560 | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|------|-----|-----|
| Pro | Ala | His | Pro | Ala | Ala | Pro | Thr | Gly | Leu | Leu | Leu | Thr | Gly | Thr |
| 7565 | | | | | | 7570 | | | | | | 7575 | | |
| Leu | Val | Gln | Ala | Leu | Gly | Asp | Ala | Gly | Val | Asp | Ala | Pro | Leu | Trp |
| 7580 | | | | | | 7585 | | | | | 7590 | | | |
| Cys | Leu | Thr | Thr | Gly | Ala | Val | Ala | Thr | Ala | Pro | Ser | Asp | Leu | Ile |
| 7595 | | | | | | 7600 | | | | | 7605 | | | |
| Gly | Ser | Ala | Ala | Gln | Ala | Gln | Val | Trp | Gly | Leu | Gly | Arg | Val | Val |
| 7610 | | | | | | 7615 | | | | | 7620 | | | |
| Ala | Leu | Glu | His | Pro | Glu | Arg | Trp | Gly | Gly | Leu | Val | Asp | Leu | Pro |
| 7625 | | | | | | 7630 | | | | | 7635 | | | |
| Val | Pro | Ala | Asp | Glu | Arg | Ala | Leu | Asp | Arg | Leu | Leu | Ala | Val | Leu |
| 7640 | | | | | | 7645 | | | | | 7650 | | | |
| Ala | Gly | Ala | Gly | Asp | Glu | Asp | Gln | Ile | Ala | Val | Arg | Ser | Ala | Gly |
| 7655 | | | | | | 7660 | | | | | 7665 | | | |
| Leu | Leu | Ala | Arg | Arg | Ile | Gly | His | Ala | Ala | Pro | Pro | Ala | Ala | Gly |
| 7670 | | | | | | 7675 | | | | | 7680 | | | |
| Gln | His | Ala | Asp | Ser | Gly | Thr | Ser | Gly | Ala | Gly | Ala | Ala | Ala | Gly |
| 7685 | | | | | | 7690 | | | | | 7695 | | | |
| Ser | Ala | Trp | Arg | Pro | Arg | Gly | Thr | Val | Leu | Val | Thr | Gly | Gly | Thr |
| 7700 | | | | | | 7705 | | | | | 7710 | | | |
| Gly | Ala | Leu | Gly | Gly | His | Val | Ala | Arg | Trp | Leu | Ala | Ala | His | Gly |
| 7715 | | | | | | 7720 | | | | | 7725 | | | |
| Ala | Glu | His | Leu | Val | Leu | Leu | Ser | Arg | Arg | Gly | Pro | Gln | Ala | Pro |
| 7730 | | | | | | 7735 | | | | | 7740 | | | |
| Gly | Ala | Asp | Ala | Leu | Val | Ala | Glu | Ile | Ala | Ala | Leu | Gly | Ala | Gly |
| 7745 | | | | | | 7750 | | | | | 7755 | | | |
| Ala | Thr | Ala | Val | Ala | Cys | Asp | Val | Thr | Asp | Arg | Thr | Ala | Val | Ser |
| 7760 | | | | | | 7765 | | | | | 7770 | | | |
| Glu | Leu | Leu | Ala | Gly | Leu | Ala | Asp | Gly | Thr | Tyr | Gly | Pro | Gly | Leu |
| 7775 | | | | | | 7780 | | | | | 7785 | | | |
| Thr | Ala | Val | Phe | His | Thr | Ala | Gly | Ala | Gly | Gln | Phe | Ala | Pro | Leu |
| 7790 | | | | | | 7795 | | | | | 7800 | | | |
| Asp | Gly | Thr | Gly | Pro | Gly | Glu | Val | Ala | Glu | Val | Val | Ala | Ala | Lys |
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| Leu | Asp | Ala | Phe | Val | Leu | Phe | Ser | Ser | Ile | Ala | Gly | Val | Trp | Gly |
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<211> 3428

<212> PRT

<213> Streptomyces aizunensis

<400> 23

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| Val | Ala | Ser | Ala | Asn | Glu | Glu | Lys | Leu | Leu | Glu | Asn | Leu | Lys | Trp | Met |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Thr | Asn | Glu | Leu | Arg | Arg | Ala | Arg | Arg | Arg | Leu | His | Glu | Val | Glu | Ala |
| | | | 20 | | | | | 25 | | | | | 30 | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Ala | Gln | Glu | Pro | Ile | Ala | Ile | Val | Ala | Met | Ser | Cys | Arg | Phe | Pro |
| | | 35 | | | | | 40 | | | | | 45 | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Gly | Val | Gly | Ser | Pro | Glu | Asp | Leu | Trp | Arg | Leu | Val | Asp | Glu | Gly |
| | 50 | | | | | | 55 | | | | 60 | | | | |

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Asp | Ala | Ile | Thr | Gly | Phe | Pro | Ala | Asp | Arg | Gly | Trp | Asp | Ile | Glu | 65 | 70 | 75 | 80 |
| Ser | Leu | Ala | Asp | Pro | Asp | Pro | Asp | Arg | Lys | Gly | Thr | Phe | Tyr | Asn | Thr | 85 | 90 | 95 | |
| Gly | Gly | Gly | Phe | Leu | Asp | Gly | Ala | Thr | Ala | Phe | Asp | Pro | Gly | Phe | Phe | 100 | 105 | 110 | |
| Gly | Ile | Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg | Gln | 115 | 120 | 125 | |
| Leu | Leu | Glu | Thr | Ser | Trp | Glu | Val | Phe | Glu | Arg | Ala | Gly | Ile | Asp | Pro | 130 | 135 | 140 | |
| Ala | Ala | Val | Arg | Gly | Ser | Arg | Thr | Gly | Val | Tyr | Val | Gly | Ala | Gly | Ala | 145 | 150 | 155 | 160 |
| Met | Gly | Tyr | Gly | Ala | Asp | Leu | Lys | Glu | Ala | Pro | Glu | Gly | Leu | Glu | Gly | 165 | 170 | 175 | |
| Leu | Leu | Leu | Thr | Gly | Gly | Ala | Thr | Ser | Val | Leu | Ser | Gly | Arg | Val | Ser | 180 | 185 | 190 | |
| Tyr | Val | Phe | Gly | Leu | Glu | Gly | Pro | Ala | Ala | Thr | Val | Asp | Thr | Ala | Cys | 195 | 200 | 205 | |
| Ser | Ser | Ser | Leu | Val | Ala | Leu | His | Leu | Ala | Thr | Gln | Ala | Leu | Arg | Gln | 210 | 215 | 220 | |
| Arg | Glu | Cys | Ser | Leu | Ala | Leu | Val | Gly | Gly | Val | Cys | Val | Met | Pro | Ser | 225 | 230 | 235 | 240 |
| Pro | Asp | Val | Phe | Val | Glu | Phe | Ser | Arg | Gln | Arg | Gly | Leu | Ser | Pro | Asp | 245 | 250 | 255 | |
| Gly | Arg | Cys | Lys | Ser | Phe | Ala | Ala | Ser | Ala | Asp | Gly | Thr | Gly | Trp | Ser | 260 | 265 | 270 | |
| Glu | Gly | Val | Gly | Val | Leu | Leu | Val | Glu | Arg | Leu | Ser | Asp | Ala | Arg | Arg | 275 | 280 | 285 | |
| Asn | Gly | His | Pro | Val | Leu | Ala | Val | Val | Arg | Gly | Ser | Ala | Val | Asn | Gln | 290 | 295 | 300 | |
| Asp | Gly | Ala | Ser | Asn | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ala | Gln | Gln | 305 | 310 | 315 | 320 |
| Arg | Val | Ile | Arg | Gln | Ala | Leu | Glu | Asn | Ala | Arg | Leu | Ser | Ala | Ala | Glu | 325 | 330 | 335 | |
| Val | Asp | Val | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Thr | Leu | Gly | Asp | Pro | 340 | 345 | 350 | |
| Ile | Glu | Ala | Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Gln | Asp | Arg | Pro | Glu | 355 | 360 | 365 | |
| Gly | Arg | Pro | Leu | Arg | Leu | Gly | Ser | Leu | Lys | Ser | Asn | Ile | Gly | His | Thr | 370 | 375 | 380 | |

Gln Ala Ala Ala Gly Val Ala Gly Ile Ile Lys Met Val Met Ala Met
 385 390 395 400
 Arg His Gly Val Leu Pro Gln Thr Leu His Val Asp Glu Pro Thr Pro
 405 410 415
 Asn Val Asp Trp Thr Ala Gly Ala Val Ser Leu Leu Thr Glu Pro Met
 420 425 430
 Pro Trp Pro Glu Thr Gly Ala Pro Arg Arg Ala Ala Val Ser Ala Phe
 435 440 445
 Gly Val Ser Gly Thr Asn Ala His Thr Ile Ile Glu Gln Ala Pro Glu
 450 455 460
 Pro Asp Ala Glu Ser Val Ser Val Ser Gly Ser Ala Pro Ala Ala Ala
 465 470 475 480
 Pro Ala Val Pro Thr Pro Val Pro Thr Leu Val Pro Ala Val Leu Pro
 485 490 495
 Trp Thr Leu Ser Gly Arg Ser Thr Ala Ala Leu Arg Ala Gln Ala Ala
 500 505 510
 Arg Leu Leu Thr Thr Gln Gly Gln Asp Gly Ala Thr Glu Pro Gly Arg
 515 520 525
 Pro Leu Asp Ile Gly Tyr Ser Leu Ala Thr Thr Arg Ala Ala Leu Glu
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 His Arg Ala Val Leu Leu Gly Arg Thr Glu Asp Asp Phe Ala Ala Ala
 545 550 555 560
 Leu Ser Ala Leu Ala Glu Gly Ala Glu Ser Ala Gly Leu Val Gln Gly
 565 570 575
 Arg Val Thr Glu Gly Gly Leu Ala Phe Leu Phe Thr Gly Gln Gly Ser
 580 585 590
 Gln Arg Leu Gly Met Gly Arg Glu Leu Tyr Glu Ala Tyr Pro Val Phe
 595 600 605
 Ala Asp Ala Leu Asp Ala Val Cys Ala Arg Leu Glu Leu Pro Leu Lys
 610 615 620
 Asp Val Leu Phe Gly Ala Asp Ala Gly Leu Leu Asp Glu Thr Ala Tyr
 625 630 635 640
 Thr Gln Pro Ala Leu Phe Ala Val Glu Val Ala Leu Phe Arg Leu Val
 645 650 655
 Glu Ser Trp Gly Val Lys Pro Asp Phe Val Ala Gly His Ser Ile Gly
 660 665 670
 Glu Ile Ala Ala Ala His Val Ala Gly Val Phe Ser Leu Glu Asp Ala
 675 680 685
 Cys Ala Leu Val Ser Ala Arg Gly Arg Leu Met Gly Ala Leu Pro Ala
 690 695 700

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|-----|------|-----|-----|-----|-----|------|------|-----|-----|-----|------|------|-----|-----|-----|--|
| Gly | Gly | Val | Met | Ile | Ala | Val | Gln | Ala | Ser | Glu | Ala | Glu | Val | Leu | Pro | |
| 705 | | | | | 710 | | | | | 715 | | | | | 720 | |
| Leu | Leu | Thr | Asp | Arg | Val | Ser | Ile | Ala | Ala | Ile | Asn | Gly | Pro | Gln | Ser | |
| | | | | 725 | | | | | 730 | | | | | 735 | | |
| Val | Val | Ile | Ala | Gly | Asp | Glu | Ala | Asp | Ala | Val | Ala | Ile | Ala | Gly | Ser | |
| | | | 740 | | | | | 745 | | | | | 750 | | | |
| Phe | Ala | Asp | Arg | Lys | Ser | Lys | Arg | Leu | Thr | Val | Ser | His | Ala | Phe | His | |
| | | 755 | | | | | 760 | | | | | 765 | | | | |
| Ser | Pro | His | Met | Asp | Gly | Met | Leu | Glu | Asp | Phe | Arg | Leu | Val | Ala | Glu | |
| | 770 | | | | | 775 | | | | | 780 | | | | | |
| Gly | Leu | Ser | Tyr | Glu | Ala | Pro | Arg | Ile | Pro | Val | Val | Ser | Asn | Leu | Thr | |
| 785 | | | | | 790 | | | | | 795 | | | | | 800 | |
| Gly | Ala | Leu | Val | Ser | Asp | Glu | Met | Gly | Ser | Ala | Glu | Phe | Trp | Val | Arg | |
| | | | | 805 | | | | | 810 | | | | | 815 | | |
| His | Val | Arg | Glu | Ala | Val | Arg | Phe | Leu | Asp | Gly | Ile | Arg | Thr | Leu | Glu | |
| | | | 820 | | | | | 825 | | | | | 830 | | | |
| Ala | Ala | Gly | Val | Thr | Lys | Tyr | Val | Glu | Leu | Gly | Pro | Asp | Gly | Val | Leu | |
| | | 835 | | | | | 840 | | | | | 845 | | | | |
| Ser | Ala | Met | Ala | Gln | Asp | Cys | Val | Ser | Gly | Glu | Gly | Ser | Val | Phe | Ile | |
| | 850 | | | | | 855 | | | | | 860 | | | | | |
| Pro | Val | Leu | Arg | Lys | Ala | Arg | Pro | Glu | Ala | Glu | Ser | Val | Thr | Thr | Ala | |
| 865 | | | | | 870 | | | | | 875 | | | | | 880 | |
| Leu | Ala | Thr | Ala | His | Val | His | Gly | Ile | Pro | Val | Asp | Trp | Gln | Ala | Phe | |
| | | | | 885 | | | | | 890 | | | | | 895 | | |
| Tyr | Ala | Gly | Thr | Gly | Ala | Gln | Arg | Val | Asp | Leu | Pro | Thr | Tyr | Ala | Phe | |
| | | 900 | | | | | | 905 | | | | | 910 | | | |
| Gln | His | Glu | Arg | Tyr | Trp | Leu | Glu | Pro | Ala | Thr | Gly | Gly | Ala | Gly | Asp | |
| | | 915 | | | | | 920 | | | | | 925 | | | | |
| Val | Ser | Gly | Ala | Gly | Leu | Asp | Pro | Ala | Gly | His | Pro | Leu | Leu | Gly | Ala | |
| | 930 | | | | | 935 | | | | | 940 | | | | | |
| Ala | Val | Thr | Leu | Ala | Gly | Ser | Asp | Ser | Val | Leu | Phe | Thr | Gly | Arg | Leu | |
| 945 | | | | | 950 | | | | | 955 | | | | | 960 | |
| Ser | Leu | Arg | Thr | Gln | Pro | Trp | Leu | Ala | Asp | His | Thr | Val | Ser | Gly | Thr | |
| | | | | 965 | | | | | 970 | | | | | 975 | | |
| Thr | Val | Leu | Pro | Gly | Ala | Ala | Phe | Val | Glu | Leu | Ala | Val | Arg | Ala | Gly | |
| | | 980 | | | | | | 985 | | | | | 990 | | | |
| Asp | Gln | Ala | Gly | Cys | Glu | Arg | Val | Glu | Ala | Leu | Val | Leu | Asp | Ala | Pro | |
| | | 995 | | | | | 1000 | | | | | 1005 | | | | |
| Leu | Ala | Leu | Pro | Ala | Glu | Gly | Ala | Val | Arg | Val | Gln | Val | Leu | Val | | |
| | 1010 | | | | | 1015 | | | | | 1020 | | | | | |

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Glu | Ala | Pro | Asp | Glu | Gln | Gly | Arg | Arg | Pro | Phe | Thr | Val | Ser | Ser | 1025 | 1030 | 1035 |
| Gln | Pro | Glu | Thr | Ala | Pro | Ala | Asp | Thr | Pro | Trp | Gly | Arg | His | Ala | 1040 | 1045 | 1050 |
| Arg | Gly | Val | Leu | Ala | Pro | Thr | Ala | Pro | Ala | Pro | Ser | Phe | Asp | Leu | 1055 | 1060 | 1065 |
| Ala | Gln | Trp | Pro | Pro | Ala | Gly | Ala | Glu | Ala | Val | Asp | Ile | Thr | Asp | 1070 | 1075 | 1080 |
| Leu | Tyr | Ala | Ser | His | Asp | Thr | Pro | Gly | Ala | His | Gly | Pro | Glu | Arg | 1085 | 1090 | 1095 |
| Gly | Gly | Leu | Phe | Arg | Ala | Val | Glu | Ala | Val | Trp | Arg | Cys | Asp | Gly | 1100 | 1105 | 1110 |
| Asp | Leu | Phe | Ala | Glu | Val | Arg | Leu | Pro | Glu | Gly | Gly | Pro | Asp | Ala | 1115 | 1120 | 1125 |
| Gln | Ala | Phe | Gly | Leu | His | Pro | Ala | Leu | Leu | Asp | Ala | Ala | Ala | His | 1130 | 1135 | 1140 |
| Ala | Ala | Ser | Val | Leu | Asp | Glu | Gln | His | Gly | Thr | Gly | Ala | Gly | Leu | 1145 | 1150 | 1155 |
| Gly | Thr | Trp | Ser | Asp | Val | Thr | Leu | His | Ala | Val | Gly | Ala | Gly | Ala | 1160 | 1165 | 1170 |
| Leu | Arg | Val | Arg | Ile | Arg | Ser | Ala | Leu | Asp | Gly | Thr | Val | Gly | Leu | 1175 | 1180 | 1185 |
| Asp | Leu | Ala | Asp | Asp | Leu | Gly | Glu | Pro | Val | Ala | Thr | Val | Gly | Gly | 1190 | 1195 | 1200 |
| Leu | Thr | Pro | Arg | Pro | Phe | Ala | Gln | Ala | Gly | Ser | Gly | Gly | Gln | Val | 1205 | 1210 | 1215 |
| Val | Gln | His | Asp | Ala | Leu | Phe | Gln | Leu | Asp | Trp | Val | Arg | Leu | Pro | 1220 | 1225 | 1230 |
| Leu | Ala | Asp | Arg | Ser | Ser | Ala | Pro | Thr | Gly | Glu | Trp | Ala | Val | Leu | 1235 | 1240 | 1245 |
| Gly | Ser | Ala | Asp | Gly | Phe | Ala | Asp | Leu | Glu | Ala | Leu | Gly | Ala | Ala | 1250 | 1255 | 1260 |
| Val | Asp | Ala | Gly | Ala | Pro | Val | Pro | Pro | Tyr | Val | Val | Val | Pro | Leu | 1265 | 1270 | 1275 |
| Glu | Arg | Gln | Ala | Thr | Gly | Asn | Gly | Ser | Asp | Ala | Leu | His | Glu | Ala | 1280 | 1285 | 1290 |
| Val | His | Arg | Ala | Leu | Ala | Leu | Val | Arg | Ser | Trp | Leu | Asp | Asp | Gln | 1295 | 1300 | 1305 |
| Arg | Phe | Glu | Thr | Ser | Arg | Leu | Val | Val | Leu | Thr | Arg | Gly | Ala | Val | 1310 | 1315 | 1320 |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Leu | Phe | Asp | Ala | Ala | Leu | Ala | Ala | Gly | Arg | Pro | Val | Leu | Val | Pro |
| 1625 | | | | | | 1630 | | | | | 1635 | | | |
| Ala | Arg | Leu | His | Leu | Pro | Gly | Leu | Arg | Asn | Ala | Ala | Gly | Pro | Gly |
| 1640 | | | | | | 1645 | | | | | 1650 | | | |
| Pro | Val | Ala | Pro | Val | Phe | Arg | Ser | Leu | Leu | Gly | Ala | Ser | Gly | Arg |
| 1655 | | | | | | 1660 | | | | | 1665 | | | |
| Arg | Ala | Ala | Arg | Thr | Arg | Thr | Asp | Gly | Gly | Thr | Pro | Leu | Ala | Glu |
| 1670 | | | | | | 1675 | | | | | 1680 | | | |
| Arg | Leu | Thr | Arg | Leu | Ala | Gly | Pro | Glu | Gln | Asp | Arg | Ala | Leu | Leu |
| 1685 | | | | | | 1690 | | | | | 1695 | | | |
| Asp | Leu | Val | Arg | Ala | Gln | Val | Ala | Ser | Val | Leu | Gly | His | Ala | Ser |
| 1700 | | | | | | 1705 | | | | | 1710 | | | |
| Ala | Glu | Gln | Val | Asp | Pro | Ala | Arg | Ala | Phe | Lys | Asp | Leu | Gly | Phe |
| 1715 | | | | | | 1720 | | | | | 1725 | | | |
| Asp | Ser | Leu | Thr | Ala | Val | Glu | Leu | Arg | Asn | Arg | Leu | Gly | Ala | Ala |
| 1730 | | | | | | 1735 | | | | | 1740 | | | |
| Thr | Gly | Leu | Arg | Leu | Pro | Thr | Thr | Leu | Val | Phe | Asp | His | Pro | Thr |
| 1745 | | | | | | 1750 | | | | | 1755 | | | |
| Pro | Thr | Ala | Leu | Val | Arg | His | Leu | Arg | Thr | Asp | Leu | Leu | Gly | Ala |
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| Ala | Pro | Asp | Pro | Gly | Ala | Asp | Ala | Pro | Gly | Leu | Pro | Ala | Arg | Val |
| 1775 | | | | | | 1780 | | | | | 1785 | | | |
| Gly | Leu | Ala | Asp | Asp | Pro | Ile | Ala | Ile | Val | Ala | Met | Ser | Cys | Arg |
| 1790 | | | | | | 1795 | | | | | 1800 | | | |
| Tyr | Pro | Gly | Gly | Val | Arg | Thr | Pro | Glu | Glu | Leu | Trp | Arg | Leu | Val |
| 1805 | | | | | | 1810 | | | | | 1815 | | | |
| Glu | Thr | Gly | Gly | Asp | Ala | Ile | Ala | Gly | Leu | Pro | Gly | Asn | Arg | Gly |
| 1820 | | | | | | 1825 | | | | | 1830 | | | |
| Trp | Asp | Thr | Asp | Ala | Leu | His | Ala | Asp | Glu | Asp | Gly | Arg | Thr | Phe |
| 1835 | | | | | | 1840 | | | | | 1845 | | | |
| Ala | Gly | Gly | Phe | Leu | Tyr | Asp | Ala | Asp | Ser | Phe | Asp | Ala | Asp | Phe |
| 1850 | | | | | | 1855 | | | | | 1860 | | | |
| Phe | Gly | Ile | Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln |
| 1865 | | | | | | 1870 | | | | | 1875 | | | |
| Arg | Leu | Leu | Leu | Glu | Thr | Ser | Trp | Glu | Ala | Ile | Glu | Arg | Ala | Gly |
| 1880 | | | | | | 1885 | | | | | 1890 | | | |
| Ile | Asp | Pro | Ser | Ser | Leu | Arg | Gly | Ser | Arg | Ala | Gly | Val | Phe | Val |
| 1895 | | | | | | 1900 | | | | | 1905 | | | |
| Gly | Ala | Ala | Tyr | Ser | Gly | Tyr | Asp | Ala | Gln | Leu | Glu | Gln | Ser | Gly |
| 1910 | | | | | | 1915 | | | | | 1920 | | | |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
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| 1955 | | | | | | 1960 | | | | | 1965 | | | |
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| 1970 | | | | | | 1975 | | | | | 1980 | | | |
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| Arg | Pro | Asp | Gly | Arg | Pro | Leu | Trp | Leu | Gly | Ser | Ile | Lys | Ser | Asn |
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| Ile | Gly | His | Thr | Gln | Ala | Ala | Ala | Gly | Val | Ala | Gly | Ile | Ile | Lys |
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| Val | Asp | Glu | Pro | Thr | Ser | His | Val | Asp | Trp | Ser | Ala | Gly | Glu | Val |
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| Phe | Ser | Leu | Asp | Asp | Ala | Cys | Thr | Leu | Val | Glu | Ala | Arg | Gly | Arg |
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| Leu | Met | Gln | Ala | Leu | Pro | Thr | Gly | Gly | Val | Met | Ile | Ala | Val | Gln |
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| Ile | Ala | Ala | Ile | Asn | Gly | Pro | Gln | Ser | Val | Val | Ile | Ala | Gly | Asp |
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| Leu | Ser | Ser | Val | Leu | Pro | Ala | Leu | Ser | Asp | Trp | Arg | Arg | Asn | Gln |
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| Leu | Phe | Ser | Ser | Ile | Ala | Gly | Val | Trp | Gly | Ser | Gly | Gly | Gln | Gly |
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| Thr | Ala | Leu | Gly | His | Thr | Ser | Ala | Asp | Ala | Val | Ala | Ala | Glu | Arg |
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| Ala | Phe | Lys | Asp | Leu | Gly | Phe | Asp | Ser | Leu | Thr | Ala | Val | Glu | Leu |
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| Arg | Asn | Arg | Leu | Gly | Ala | Ala | Cys | Gly | Leu | Arg | Leu | Pro | Ser | Ser |
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 <211> 6751
 <212> PRT
 <213> Streptomyces aizunensis

 <400> 25

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| Met | Thr | Thr | Pro | Asn | Glu | Lys | Val | Val | Glu | Ala | Leu | Arg | Ala | Ser | Leu | 1 | 5 | 10 | 15 |
| Lys | Glu | Thr | Glu | Arg | Leu | Arg | Arg | Arg | Asn | Gln | Glu | Leu | Thr | Asp | Ala | 20 | 25 | 30 | |
| Ala | Arg | Glu | Pro | Ile | Ala | Ile | Val | Gly | Met | Ser | Cys | Arg | Phe | Pro | Gly | 35 | 40 | 45 | |
| Gly | Val | Ser | Ser | Pro | Glu | Asp | Leu | Trp | Arg | Leu | Val | Glu | Ser | Gly | Gly | 50 | 55 | 60 | |
| Asp | Ala | Ile | Ser | Gly | Phe | Pro | Val | Asn | Arg | Gly | Trp | Asp | Ile | Glu | Ser | 65 | 70 | 75 | 80 |
| Leu | Tyr | Asp | Pro | Asp | Pro | Asp | His | Glu | Gly | Thr | Thr | Tyr | Ala | Arg | Asp | 85 | 90 | 95 | |
| Gly | Gly | Phe | Leu | His | Glu | Ala | Ala | Asp | Phe | Asp | Pro | Ala | Phe | Phe | Gly | 100 | 105 | 110 | |
| Ile | Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | Leu | 115 | 120 | 125 | |
| Leu | Glu | Thr | Thr | Trp | Glu | Val | Phe | Glu | Arg | Ala | Gly | Ile | Asp | Pro | Ala | 130 | 135 | 140 | |
| Ser | Leu | Arg | Gly | Ser | Arg | Ala | Gly | Val | Phe | Val | Gly | Ala | Ser | Ala | Asn | 145 | 150 | 155 | 160 |
| Ala | Tyr | Gly | Ala | Gly | Ser | His | Asp | Leu | Pro | Asp | Gly | Val | Glu | Gly | His | 165 | 170 | 175 | |
| Leu | Leu | Thr | Gly | Thr | Ala | Ser | Ser | Val | Leu | Ser | Gly | Arg | Leu | Ala | Tyr | 180 | 185 | 190 | |
| Val | Phe | Gly | Leu | Glu | Gly | Pro | Ala | Ala | Thr | Ile | Asp | Thr | Ala | Cys | Ser | 195 | 200 | 205 | |
| Ser | Ser | Ser | Val | Ala | Leu | His | Met | Ala | Val | Gln | Ala | Leu | Arg | Gln | Gly | 210 | 215 | 220 | |
| Glu | Cys | Ser | Leu | Ala | Leu | Ala | Ala | Gly | Val | Thr | Val | Leu | Ala | Gly | Pro | 225 | 230 | 235 | 240 |
| Asp | Val | Phe | Val | Glu | Phe | Ser | Arg | Gln | Arg | Gly | Leu | Ser | Pro | Asp | Gly | 245 | 250 | 255 | |
| Arg | Cys | Arg | Ser | Phe | Ala | Glu | Ser | Ala | Asp | Gly | Thr | Gly | Trp | Ser | Glu | 260 | 265 | 270 | |
| Gly | Ala | Gly | Val | Leu | Leu | Val | Glu | Arg | Leu | Ser | Asp | Ala | Arg | Arg | Asn | 275 | 280 | 285 | |
| Gly | His | His | Ile | Leu | Ala | Val | Val | Arg | Gly | Ser | Ala | Val | Asn | Gln | Asp | 290 | 295 | 300 | |
| Gly | Ala | Ser | Asn | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ala | Gln | Gln | Lys | 305 | 310 | 315 | 320 |

Val Ile Arg Gln Ala Leu Glu Ser Ala Arg Leu Thr Pro Ala Asp Ile
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Asp Ala Val Glu Ala His Gly Thr Gly Thr Thr Leu Gly Asp Pro Ile
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Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Gly Arg Thr Asp Gly
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Arg Pro Leu Trp Leu Gly Ser Leu Lys Ser Asn Leu Gly His Thr Gln
370 375 380
Asn Ala Ala Gly Val Ala Gly Ile Ile Lys Met Val Met Ala Met Arg
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His Gly Val Leu Pro Arg Thr Leu His Val Asp Glu Pro Thr Ser His
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Val Asp Trp Ser Thr Gly Ala Val Ala Leu Leu Thr Glu Pro Val Glu
420 425 430
Trp Pro Glu Thr Gly Arg Pro Arg Arg Val Gly Val Ser Ala Phe Gly
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Val Ser Gly Thr Asn Val His Thr Ile Ile Glu Gln Ala Pro Ala Pro
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Ala Pro Ala Pro Val Ala Asp Asp Thr Ser Glu Pro Ala Pro Ala Ala
465 470 475 480
Arg Pro Lys Ala Leu Pro Trp Leu Leu Ser Ala Lys Gly Arg Asp Ala
485 490 495
Leu Arg Asp Arg Ala Ala Gln Leu Leu Ala Tyr Ala Glu Glu His Pro
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Asp Leu Arg Pro Val Asp Ile Ala Gly Ser Leu Ala Val Gly Arg Pro
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Ser Phe Glu Asp Arg Ala Ala Val Val Ala Ala Asp Arg Glu Gly Leu
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Leu Pro Leu Lys Asn Val Leu Phe Gly Thr Asp Ser Ala Ala Leu Asp
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Glu Thr Ser Tyr Thr Gln Pro Ala Leu Phe Ala Val Glu Val Ala Leu
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His Ser Ile Gly Glu Ile Ala Ala Ala His Val Ala Gly Val Phe Ser
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Ala Leu Pro Gly Gly Gly Val Met Ile Ala Val Gln Ala Ser Glu Asp
690 695 700
Glu Val Leu Pro Leu Leu Thr Asp Arg Val Ser Ile Ala Ala Ile Asn
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Ile Ala Glu Ser Phe Ala Asp Arg Lys Ser Lys Arg Leu Thr Val Ser
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His Ala Phe His Ser Pro His Met Asp Gly Met Leu Glu Asp Phe Arg
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Val Val Ala Glu Gly Leu Ser Tyr Glu Ala Pro Arg Ile Pro Val Val
770 775 780
Ser Asn Leu Thr Gly Ala Leu Val Ser Asp Glu Met Gly Ser Ala Asp
785 790 795 800
Phe Trp Val Arg His Val Arg Glu Thr Val Arg Phe Leu Asp Gly Ile
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Gly Arg Leu Gly Arg Thr Ser His Pro Trp Leu Ala Asp His Ala Val
945 950 955 960

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Met | Asp | Thr | Val | Leu | Leu | Pro | Gly | Thr | Ala | Phe | Val | Asp | Leu | Ala | Val | 965 | 970 | 975 |
| Arg | Ala | Gly | Asp | Gln | Val | Gly | Cys | Asp | Val | Val | Glu | Glu | Leu | Thr | Leu | 980 | 985 | 990 |
| Glu | Ala | Pro | Leu | Val | Leu | Pro | Glu | Arg | Gly | Ala | Val | Gln | Ile | Gln | Met | 995 | 1000 | 1005 |
| His | Val | Gly | Ala | Pro | Asp | Ala | Asp | Gly | Thr | Gly | Arg | Arg | Thr | Phe | | 1010 | 1015 | 1020 |
| Thr | Leu | Ser | Ser | Arg | Thr | Gln | Asp | Gly | Ala | Ala | Asp | Glu | Pro | Trp | | 1025 | 1030 | 1035 |
| Thr | Arg | His | Ala | Gly | Gly | Val | Leu | Ala | His | Gly | Ala | Ala | Gln | Pro | | 1040 | 1045 | 1050 |
| Ala | Phe | Ala | Pro | Val | Gln | Trp | Pro | Pro | Ala | Gly | Ala | Glu | Pro | Ile | | 1055 | 1060 | 1065 |
| Pro | Thr | Glu | Ser | Leu | Tyr | Ala | Asp | Leu | Ala | Glu | Val | Gly | Met | Gly | | 1070 | 1075 | 1080 |
| Tyr | Gly | Pro | Ala | Phe | Arg | Gly | Leu | Thr | Ala | Ala | Trp | Arg | His | Gly | | 1085 | 1090 | 1095 |
| Glu | Ser | Val | Tyr | Val | Glu | Val | Ala | Leu | Pro | Glu | Glu | Thr | Ala | Ser | | 1100 | 1105 | 1110 |
| Thr | Ala | Arg | Asp | Phe | Gly | Leu | His | Pro | Ala | Leu | Leu | Asp | Ala | Ala | | 1115 | 1120 | 1125 |
| Leu | His | Ala | Leu | Gly | Leu | Gly | Val | Leu | Gly | Gly | Val | Glu | Gly | Glu | | 1130 | 1135 | 1140 |
| Gly | Arg | Leu | Pro | Phe | Ala | Trp | Ser | Gly | Val | Thr | Leu | His | Ala | Ala | | 1145 | 1150 | 1155 |
| Gly | Ala | Asp | Ala | Leu | Arg | Val | His | Leu | Ala | Pro | Ala | Gly | Ala | His | | 1160 | 1165 | 1170 |
| Gly | Val | Arg | Leu | Glu | Ile | Ala | Asp | Ala | Ala | Gly | Ala | Pro | Val | Ala | | 1175 | 1180 | 1185 |
| Thr | Val | Asp | Ser | Leu | Val | Leu | Arg | Thr | Val | Ser | Glu | Glu | Gln | Val | | 1190 | 1195 | 1200 |
| Arg | Ala | Ala | Arg | Thr | Ala | Tyr | His | Glu | Ser | Val | Phe | Arg | Ala | Glu | | 1205 | 1210 | 1215 |
| Trp | Thr | Ala | Leu | Pro | Thr | Ala | Ala | Glu | Ser | Ala | Ala | Thr | His | Gly | | 1220 | 1225 | 1230 |
| Arg | Trp | Ala | Val | Leu | Gly | Ala | Ala | Asp | Ala | Gly | Asp | Ser | Pro | Arg | | 1235 | 1240 | 1245 |
| Asp | Ala | Leu | Val | Asn | Gly | Leu | Leu | Gly | His | Leu | Pro | Gly | Glu | Val | | 1250 | 1255 | 1260 |

| | | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|------|-----|-----|--|
| Ala | Arg | Tyr | Ala | Asp | Leu | Ala | Glu | Leu | Ala | Ala | Ala | Val | Glu | Ala | |
| 1265 | | | | | | 1270 | | | | | | 1275 | | | |
| Gly | Ala | Ala | Thr | Pro | Asp | Ala | Val | Phe | Ala | Ala | Tyr | Ala | Arg | Ser | |
| 1280 | | | | | | 1285 | | | | | 1290 | | | | |
| Asp | Asp | Asp | Gly | Pro | Ala | Ala | Pro | Asp | Val | Ser | Ala | Pro | Asp | Val | |
| 1295 | | | | | | 1300 | | | | | 1305 | | | | |
| Ser | Ala | Gln | Ala | Val | His | Ala | Ala | Thr | His | Asp | Ala | Leu | Ala | Leu | |
| 1310 | | | | | | 1315 | | | | | 1320 | | | | |
| Val | Gln | Thr | Trp | Phe | Gly | Glu | Glu | Pro | Phe | Ala | Gly | Asp | Arg | Phe | |
| 1325 | | | | | | 1330 | | | | | 1335 | | | | |
| Ala | Ala | Thr | Arg | Leu | Val | Val | Leu | Thr | Arg | Gly | Ala | Val | Ala | Ala | |
| 1340 | | | | | | 1345 | | | | | 1350 | | | | |
| Gly | Asp | Gly | Asp | Thr | Val | Thr | Asp | Pro | Ala | His | Ala | Ala | Val | Trp | |
| 1355 | | | | | | 1360 | | | | | 1365 | | | | |
| Gly | Leu | Leu | Arg | Ser | Ala | Gln | Ser | Glu | Tyr | Pro | Asp | Arg | Leu | Leu | |
| 1370 | | | | | | 1375 | | | | | 1380 | | | | |
| Leu | Ile | Asp | Thr | Asp | Gly | Val | Glu | Asp | Ser | Val | His | Ala | Leu | Pro | |
| 1385 | | | | | | 1390 | | | | | 1395 | | | | |
| Ala | Val | Leu | Ala | Val | Gly | Glu | Pro | Gln | Leu | Ala | Leu | Arg | Ala | Gly | |
| 1400 | | | | | | 1405 | | | | | 1410 | | | | |
| Ser | Val | His | Ala | Leu | Arg | Leu | Ala | Arg | Val | Ala | Ala | Ala | Thr | Pro | |
| 1415 | | | | | | 1420 | | | | | 1425 | | | | |
| Glu | Asp | Ala | Ala | Ala | Pro | Thr | Gln | Tyr | Ala | Pro | Gly | Ser | Thr | Val | |
| 1430 | | | | | | 1435 | | | | | 1440 | | | | |
| Leu | Ile | Thr | Gly | Ala | Gly | Gly | Met | Leu | Gly | Gly | Leu | Ile | Ala | Arg | |
| 1445 | | | | | | 1450 | | | | | 1455 | | | | |
| Arg | Leu | Val | Ala | Glu | His | Gly | Val | Arg | His | Leu | Leu | Leu | Val | Gly | |
| 1460 | | | | | | 1465 | | | | | 1470 | | | | |
| Arg | Arg | Gly | Ala | Ala | Ala | Pro | Gly | Ala | Glu | Gln | Leu | Ser | Ala | Glu | |
| 1475 | | | | | | 1480 | | | | | 1485 | | | | |
| Leu | Ala | Glu | Ala | Gly | Ala | Ser | Val | Thr | Trp | Ala | Ala | Cys | Asp | Val | |
| 1490 | | | | | | 1495 | | | | | 1500 | | | | |
| Ala | Asp | Arg | Asp | Ala | Leu | Ser | Ala | Val | Leu | His | Ala | Ile | Pro | Ala | |
| 1505 | | | | | | 1510 | | | | | 1515 | | | | |
| Glu | His | Pro | Leu | Gly | Ala | Val | Val | His | Thr | Ala | Gly | Val | Leu | Asp | |
| 1520 | | | | | | 1525 | | | | | 1530 | | | | |
| Asp | Gly | Val | Ile | Ala | Ser | Leu | Thr | Pro | Glu | Arg | Leu | Ser | Ala | Val | |
| 1535 | | | | | | 1540 | | | | | 1545 | | | | |
| Leu | Arg | Pro | Lys | Val | Asp | Ala | Ala | Cys | Asn | Leu | His | Glu | Leu | Thr | |
| 1550 | | | | | | 1555 | | | | | 1560 | | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Arg | His | Leu | Asp | Leu | Thr | Ala | Phe | Val | Leu | Phe | Ser | Ser | Ile | Gly |
| 1565 | | | | | | 1570 | | | | | 1575 | | | |
| Gly | Val | Phe | Gly | Gly | Pro | Gly | Gln | Gly | Asn | Tyr | Ala | Ala | Ala | Asn |
| 1580 | | | | | | 1585 | | | | | 1590 | | | |
| Val | Phe | Leu | Asp | Ala | Leu | Ala | Gln | His | Arg | Arg | Ser | Gln | Gly | Leu |
| 1595 | | | | | | 1600 | | | | | 1605 | | | |
| Ala | Ala | Thr | Ser | Leu | Ala | Trp | Ala | Leu | Trp | Ala | Asp | Ser | Thr | Gly |
| 1610 | | | | | | 1615 | | | | | 1620 | | | |
| Met | Ala | Gly | Ser | Leu | Asp | Glu | Ala | Asp | Ile | Ser | Arg | Met | Arg | Arg |
| 1625 | | | | | | 1630 | | | | | 1635 | | | |
| Gly | Gly | Leu | Pro | Pro | Leu | Thr | Thr | Ala | Glu | Gly | Leu | Glu | Leu | Phe |
| 1640 | | | | | | 1645 | | | | | 1650 | | | |
| Asp | Leu | Ala | His | Arg | Ile | Asp | Glu | Ala | Ala | Pro | Val | Leu | Met | Arg |
| 1655 | | | | | | 1660 | | | | | 1665 | | | |
| Ala | Asp | Leu | Thr | Ala | Leu | Arg | Thr | Gln | Ala | Gln | Ala | Gly | Thr | Met |
| 1670 | | | | | | 1675 | | | | | 1680 | | | |
| Ser | Pro | Leu | Leu | Arg | Gly | Leu | Val | Arg | Val | Pro | Ala | Arg | Arg | Ser |
| 1685 | | | | | | 1690 | | | | | 1695 | | | |
| Ala | Ser | Gly | Ala | Ala | Gly | Thr | Gly | Gly | Glu | Ser | Gly | Leu | Arg | Glu |
| 1700 | | | | | | 1705 | | | | | 1710 | | | |
| Arg | Leu | Ala | Gly | Leu | Ser | Ala | Ala | Glu | Arg | Asp | Arg | Thr | Leu | Leu |
| 1715 | | | | | | 1720 | | | | | 1725 | | | |
| Asp | Leu | Val | Arg | Lys | Gln | Val | Ala | Ala | Ala | Leu | Gly | Tyr | Pro | Gly |
| 1730 | | | | | | 1735 | | | | | 1740 | | | |
| Pro | Ser | Ala | Val | Glu | Pro | Gly | Arg | Ser | Phe | Lys | Glu | Leu | Gly | Phe |
| 1745 | | | | | | 1750 | | | | | 1755 | | | |
| Asp | Ser | Leu | Thr | Ala | Val | Glu | Leu | Arg | Asn | Leu | Leu | Gly | Asp | Ala |
| 1760 | | | | | | 1765 | | | | | 1770 | | | |
| Thr | Gly | Arg | Arg | Leu | Pro | Ala | Thr | Leu | Val | Phe | Asp | Tyr | Pro | Thr |
| 1775 | | | | | | 1780 | | | | | 1785 | | | |
| Ala | Thr | Ala | Leu | Ala | Gly | Tyr | Leu | Arg | Glu | Glu | Ile | Ile | Gly | Asp |
| 1790 | | | | | | 1795 | | | | | 1800 | | | |
| Leu | Ala | Asp | Ala | Val | Thr | Ala | Pro | Ala | Leu | Val | Pro | Ser | Ala | Ala |
| 1805 | | | | | | 1810 | | | | | 1815 | | | |
| Val | Ala | Gly | Ala | Gly | Ala | Gly | Ala | Asp | Asp | Asp | Asp | Pro | Ile | Ala |
| 1820 | | | | | | 1825 | | | | | 1830 | | | |
| Ile | Val | Ala | Met | Ser | Cys | Arg | Phe | Pro | Gly | Gly | Ile | Ala | Ser | Pro |
| 1835 | | | | | | 1840 | | | | | 1845 | | | |
| Glu | Asp | Leu | Trp | Gln | Leu | Leu | Val | Thr | Gly | Arg | Asp | Gly | Ile | Thr |
| 1850 | | | | | | 1855 | | | | | 1860 | | | |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Gly | Phe | Pro | Ala | Asp | Arg | Gly | Trp | Asp | Leu | Asp | Ser | Leu | Tyr | Ser |
| 1865 | | | | | | 1870 | | | | | 1875 | | | |
| Asp | Asp | Pro | Asp | Arg | Glu | Gly | Thr | Ser | Tyr | Ala | Arg | Glu | Gly | Gly |
| 1880 | | | | | | 1885 | | | | | 1890 | | | |
| Phe | Leu | His | Glu | Ala | Ala | Glu | Phe | Asp | Ala | Ser | Phe | Phe | Gly | Ile |
| 1895 | | | | | | 1900 | | | | | 1905 | | | |
| Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | Leu |
| 1910 | | | | | | 1915 | | | | | 1920 | | | |
| Leu | Glu | Thr | Thr | Trp | Glu | Thr | Phe | Glu | Arg | Ala | Gly | Ile | Asp | Pro |
| 1925 | | | | | | 1930 | | | | | 1935 | | | |
| Thr | Ser | Leu | Arg | Gly | Ser | Arg | Thr | Gly | Val | Phe | Val | Gly | Ser | Asn |
| 1940 | | | | | | 1945 | | | | | 1950 | | | |
| Ala | Gln | Asp | Tyr | Leu | Gln | Leu | Trp | Leu | Asn | Asp | Ala | Asp | Gly | Leu |
| 1955 | | | | | | 1960 | | | | | 1965 | | | |
| Glu | Gly | His | Leu | Gly | Thr | Gly | Asn | Ala | Ala | Ser | Val | Val | Ser | Gly |
| 1970 | | | | | | 1975 | | | | | 1980 | | | |
| Arg | Leu | Ser | Tyr | Thr | Phe | Gly | Leu | Glu | Gly | Pro | Ala | Val | Thr | Val |
| 1985 | | | | | | 1990 | | | | | 1995 | | | |
| Asp | Thr | Ala | Cys | Ser | Ser | Ser | Leu | Val | Thr | Leu | His | Leu | Ala | Ala |
| 2000 | | | | | | 2005 | | | | | 2010 | | | |
| Gln | Ala | Leu | Arg | Arg | Gly | Glu | Cys | Ser | Met | Ala | Leu | Ala | Gly | Ala |
| 2015 | | | | | | 2020 | | | | | 2025 | | | |
| Val | Thr | Ile | Met | Ser | Thr | Pro | Gly | Ala | Phe | Thr | Glu | Phe | Ser | Arg |
| 2030 | | | | | | 2035 | | | | | 2040 | | | |
| Gln | Arg | Gly | Leu | Ala | Ala | Asp | Gly | Arg | Ile | Lys | Ala | Phe | Ala | Ala |
| 2045 | | | | | | 2050 | | | | | 2055 | | | |
| Ala | Ala | Asp | Gly | Thr | Ser | Trp | Ser | Glu | Gly | Val | Gly | Leu | Leu | Leu |
| 2060 | | | | | | 2065 | | | | | 2070 | | | |
| Val | Glu | Arg | Leu | Ser | Asp | Ala | Arg | Arg | Asn | Gly | His | Pro | Val | Leu |
| 2075 | | | | | | 2080 | | | | | 2085 | | | |
| Ala | Val | Val | Arg | Gly | Thr | Ala | Val | Asn | Gln | Asp | Gly | Ala | Ser | Asn |
| 2090 | | | | | | 2095 | | | | | 2100 | | | |
| Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln | Arg | Val | Ile | Arg |
| 2105 | | | | | | 2110 | | | | | 2115 | | | |
| Glu | Ala | Leu | Ala | Asp | Ala | Gly | Leu | Ser | Ala | Ala | Glu | Val | Asp | Ala |
| 2120 | | | | | | 2125 | | | | | 2130 | | | |
| Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Thr | Leu | Gly | Asp | Pro | Ile | Glu |
| 2135 | | | | | | 2140 | | | | | 2145 | | | |
| Ala | Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Gln | Gly | Arg | Pro | Asp | Asp |
| 2150 | | | | | | 2155 | | | | | 2160 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Gln | Pro | Leu | Trp | Leu | Gly | Ser | Val | Lys | Ser | Asn | Ile | Gly | His | Thr |
| 2165 | | | | | | 2170 | | | | | 2175 | | | |
| Gln | Ala | Val | Ala | Gly | Ala | Ala | Gly | Ile | Ile | Lys | Met | Val | Met | Ala |
| 2180 | | | | | | 2185 | | | | | 2190 | | | |
| Met | Arg | His | Gly | Val | Leu | Pro | Gln | Thr | Leu | His | Ile | Asp | Glu | Pro |
| 2195 | | | | | | 2200 | | | | | 2205 | | | |
| Thr | Pro | Tyr | Val | Asp | Trp | Ser | Ala | Gly | Asp | Ile | Ala | Leu | Leu | Thr |
| 2210 | | | | | | 2215 | | | | | 2220 | | | |
| Glu | Gln | Arg | Ala | Trp | Pro | Glu | Thr | Gly | Arg | Pro | Arg | Arg | Ala | Gly |
| 2225 | | | | | | 2230 | | | | | 2235 | | | |
| Val | Ser | Ser | Phe | Gly | Tyr | Ser | Gly | Thr | Asn | Ala | His | Ala | Val | Ile |
| 2240 | | | | | | 2245 | | | | | 2250 | | | |
| Glu | Gln | Ala | Pro | Gln | Asn | Ala | Met | Glu | Arg | Thr | Pro | Gln | Gly | Asp |
| 2255 | | | | | | 2260 | | | | | 2265 | | | |
| Asn | Leu | Pro | Ala | Arg | Thr | Pro | Ala | Thr | Arg | Thr | Leu | Pro | Val | Leu |
| 2270 | | | | | | 2275 | | | | | 2280 | | | |
| Pro | Leu | Leu | Val | Ser | Gly | Arg | Thr | Ala | Pro | Ala | Leu | Arg | Ala | Gln |
| 2285 | | | | | | 2290 | | | | | 2295 | | | |
| Ala | Glu | Arg | Leu | Arg | Pro | Ala | Ala | Thr | Ala | Leu | Ala | Thr | Gly | Thr |
| 2300 | | | | | | 2305 | | | | | 2310 | | | |
| Val | Thr | Asn | Ser | Gly | Ala | Leu | Glu | Ala | Leu | Asp | Leu | Gly | Tyr | Ser |
| 2315 | | | | | | 2320 | | | | | 2325 | | | |
| Leu | Ala | Thr | Ser | Arg | Ala | Ala | Leu | Glu | His | Arg | Ala | Val | Leu | Ile |
| 2330 | | | | | | 2335 | | | | | 2340 | | | |
| Gly | Thr | Pro | Ser | Asp | Gly | Gln | Ala | Leu | Ala | Ser | Arg | Leu | Asp | Ala |
| 2345 | | | | | | 2350 | | | | | 2355 | | | |
| Leu | Ala | Ala | Gly | Glu | Gln | Val | Pro | Gly | Leu | Val | Gln | Gly | Thr | Ala |
| 2360 | | | | | | 2365 | | | | | 2370 | | | |
| Ser | Gly | Gly | Gly | Leu | Ala | Phe | Leu | Phe | Thr | Gly | Gln | Gly | Ser | Gln |
| 2375 | | | | | | 2380 | | | | | 2385 | | | |
| Arg | Leu | Gly | Met | Gly | Arg | Glu | Leu | Tyr | Glu | Thr | Tyr | Pro | Val | Phe |
| 2390 | | | | | | 2395 | | | | | 2400 | | | |
| Ala | Glu | Ala | Leu | Asp | Ala | Val | Cys | Ala | Arg | Leu | Glu | Leu | Pro | Leu |
| 2405 | | | | | | 2410 | | | | | 2415 | | | |
| Lys | Glu | Val | Leu | Phe | Gly | Ala | Asp | Gly | Ala | Ala | Leu | Asp | Gln | Thr |
| 2420 | | | | | | 2425 | | | | | 2430 | | | |
| Ala | Val | Thr | Gln | Pro | Ala | Leu | Phe | Ala | Ile | Glu | Val | Ala | Leu | Phe |
| 2435 | | | | | | 2440 | | | | | 2445 | | | |
| Arg | Leu | Val | Glu | Ser | Trp | Gly | Leu | Arg | Pro | Asp | Phe | Val | Ala | Gly |
| 2450 | | | | | | 2455 | | | | | 2460 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| His | Ser | Ile | Gly | Glu | Ile | Ala | Ala | Ala | His | Val | Ala | Gly | Val | Phe |
| 2465 | | | | | | 2470 | | | | | 2475 | | | |
| Ser | Leu | Glu | Asp | Ala | Cys | Arg | Leu | Val | Glu | Ala | Arg | Gly | Arg | Leu |
| 2480 | | | | | | 2485 | | | | | 2490 | | | |
| Met | Gln | Ala | Leu | Pro | Gly | Gly | Gly | Val | Met | Ile | Ala | Val | Gln | Ala |
| 2495 | | | | | | 2500 | | | | | 2505 | | | |
| Ser | Glu | Asp | Glu | Val | Leu | Pro | Leu | Leu | Thr | Asp | Arg | Val | Ser | Ile |
| 2510 | | | | | | 2515 | | | | | 2520 | | | |
| Ala | Ala | Ile | Asn | Gly | Pro | Gln | Ser | Val | Val | Ile | Ala | Gly | Asp | Glu |
| 2525 | | | | | | 2530 | | | | | 2535 | | | |
| Ala | Asp | Ala | Val | Ala | Ile | Ala | Glu | Ser | Phe | Thr | Gly | Arg | Lys | Ser |
| 2540 | | | | | | 2545 | | | | | 2550 | | | |
| Lys | His | Leu | Ala | Val | Ser | His | Ala | Phe | His | Ser | Pro | His | Met | Asp |
| 2555 | | | | | | 2560 | | | | | 2565 | | | |
| Gly | Met | Leu | Glu | Asp | Phe | Arg | Ala | Val | Ala | Glu | Gly | Leu | Ser | Tyr |
| 2570 | | | | | | 2575 | | | | | 2580 | | | |
| Glu | Ala | Pro | Arg | Ile | Ala | Val | Val | Ser | Asn | Leu | Thr | Gly | Ala | Leu |
| 2585 | | | | | | 2590 | | | | | 2595 | | | |
| Val | Ser | Asp | Glu | Met | Ser | Ser | Ala | Glu | Phe | Trp | Val | Arg | His | Val |
| 2600 | | | | | | 2605 | | | | | 2610 | | | |
| Arg | Glu | Ala | Val | Arg | Phe | Leu | Asp | Gly | Ile | Arg | Ala | Leu | Glu | Ala |
| 2615 | | | | | | 2620 | | | | | 2625 | | | |
| Ala | Gly | Val | Thr | Thr | Tyr | Val | Glu | Leu | Gly | Pro | Gly | Gly | Val | Leu |
| 2630 | | | | | | 2635 | | | | | 2640 | | | |
| Ser | Ala | Leu | Ala | Gln | Glu | Cys | Val | Ser | Gly | Asp | Gly | Ala | Ala | Phe |
| 2645 | | | | | | 2650 | | | | | 2655 | | | |
| Val | Pro | Val | Leu | Arg | Ser | Gly | Arg | Ser | Glu | Ala | Glu | Thr | Val | Val |
| 2660 | | | | | | 2665 | | | | | 2670 | | | |
| Thr | Ala | Leu | Ala | Gln | Ala | His | Val | Arg | Gly | Val | Glu | Val | Asp | Trp |
| 2675 | | | | | | 2680 | | | | | 2685 | | | |
| Ala | Ala | Phe | Phe | Ala | Gly | Thr | Gly | Ala | Glu | Arg | Ile | Asp | Leu | Pro |
| 2690 | | | | | | 2695 | | | | | 2700 | | | |
| Thr | Tyr | Ala | Phe | Gln | Arg | Gln | Arg | Tyr | Trp | Pro | Glu | Thr | Val | Leu |
| 2705 | | | | | | 2710 | | | | | 2715 | | | |
| Ser | Thr | Val | Gly | Pro | Val | Val | Ala | Glu | Ala | Val | Asp | Ala | Val | Asp |
| 2720 | | | | | | 2725 | | | | | 2730 | | | |
| Ala | Arg | Phe | Trp | Asp | Ala | Val | Glu | Arg | Glu | Asp | Leu | Ala | Ser | Leu |
| 2735 | | | | | | 2740 | | | | | 2745 | | | |
| Val | Ala | Glu | Leu | Asp | Val | Asp | Glu | Thr | Pro | Leu | Gly | Glu | Val | Val |
| 2750 | | | | | | 2755 | | | | | 2760 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Pro | Ala | Leu | Ser | Ala | Trp | Arg | Arg | Glu | Arg | Arg | Ala | Gln | Ser | Glu |
| 2765 | | | | | | 2770 | | | | | 2775 | | | |
| Val | Asp | Gly | Trp | Arg | Tyr | Arg | Val | Ser | Trp | Lys | Pro | Leu | Ala | Asp |
| 2780 | | | | | | 2785 | | | | | 2790 | | | |
| Ala | Ser | Thr | Ala | Arg | Leu | Ser | Gly | Ser | Trp | Val | Val | Val | Ser | Pro |
| 2795 | | | | | | 2800 | | | | | 2805 | | | |
| Asp | Lys | Gly | Val | Asp | Asp | Ser | Ala | Val | Val | Ala | Gly | Leu | Ala | Gly |
| 2810 | | | | | | 2815 | | | | | 2820 | | | |
| Arg | Gly | Ala | Glu | Val | Arg | Arg | Val | Val | Val | Glu | Ala | Gly | Val | Asp |
| 2825 | | | | | | 2830 | | | | | 2835 | | | |
| Arg | Ser | Ala | Leu | Ala | Gly | Leu | Leu | Ala | Asp | Ala | Gly | Ser | Ala | Ala |
| 2840 | | | | | | 2845 | | | | | 2850 | | | |
| Gly | Val | Val | Ser | Leu | Leu | Gly | Leu | Asp | Glu | Ser | Glu | Gly | Leu | Leu |
| 2855 | | | | | | 2860 | | | | | 2865 | | | |
| Gly | Thr | Val | Gly | Leu | Val | Gln | Ala | Leu | Gly | Asp | Ala | Gly | Val | Glu |
| 2870 | | | | | | 2875 | | | | | 2880 | | | |
| Ala | Pro | Leu | Trp | Cys | Leu | Thr | Arg | Gly | Ala | Val | Ser | Val | Gly | Arg |
| 2885 | | | | | | 2890 | | | | | 2895 | | | |
| Ser | Asp | Arg | Leu | Val | Ser | Pro | Val | Gln | Ala | Gln | Val | Trp | Gly | Leu |
| 2900 | | | | | | 2905 | | | | | 2910 | | | |
| Gly | Arg | Val | Ala | Ala | Leu | Glu | Val | Pro | Glu | His | Trp | Gly | Gly | Leu |
| 2915 | | | | | | 2920 | | | | | 2925 | | | |
| Val | Asp | Leu | Pro | Glu | Val | Leu | Asp | Glu | Arg | Ala | Val | Ala | Arg | Leu |
| 2930 | | | | | | 2935 | | | | | 2940 | | | |
| Val | Gly | Val | Leu | Ala | Gly | Ser | Gly | Glu | Asp | Gln | Val | Ala | Val | Arg |
| 2945 | | | | | | 2950 | | | | | 2955 | | | |
| Ser | Ser | Gly | Val | Phe | Gly | Arg | Arg | Leu | Val | Arg | Ala | Pro | Arg | Ala |
| 2960 | | | | | | 2965 | | | | | 2970 | | | |
| Glu | Gly | Ala | Ala | Ala | Trp | Thr | Pro | Thr | Gly | Thr | Val | Leu | Val | Thr |
| 2975 | | | | | | 2980 | | | | | 2985 | | | |
| Gly | Gly | Thr | Gly | Val | Leu | Gly | Gly | Arg | Val | Ala | Arg | Trp | Leu | Ala |
| 2990 | | | | | | 2995 | | | | | 3000 | | | |
| Gly | Ala | Gly | Ala | Glu | Arg | Leu | Val | Leu | Thr | Ser | Arg | Arg | Gly | Pro |
| 3005 | | | | | | 3010 | | | | | 3015 | | | |
| Asp | Ala | Pro | Gly | Ala | Ala | Glu | Leu | Val | Glu | Glu | Leu | Thr | Thr | Gly |
| 3020 | | | | | | 3025 | | | | | 3030 | | | |
| Phe | Gly | Val | Glu | Val | Ser | Ile | Val | Ala | Cys | Asp | Ala | Ala | Asp | Arg |
| 3035 | | | | | | 3040 | | | | | 3045 | | | |
| Asp | Ala | Leu | Arg | Ala | Leu | Leu | Ser | Ala | Glu | Ala | Gly | Thr | Leu | Thr |
| 3050 | | | | | | 3055 | | | | | 3060 | | | |

| | | | | | |
|---------|-----------------|---------|-----------------|------|-------------|
| Ala Val | Ile His Thr | Ala Gly | Val Leu Asp Asp | Gly | Val Leu Asp |
| 3065 | | 3070 | | 3075 | |
| Ala Leu | Thr Pro Asp Arg | Ile | Asp Ser Val Leu | Arg | Ala Lys Ala |
| 3080 | | 3085 | | 3090 | |
| Val Ser | Ala Leu Asn Leu | His | Glu Leu Thr Ala | Glu | Leu Asp Ile |
| 3095 | | 3100 | | 3105 | |
| Glu Leu | Ser Ala Phe Val | Leu | Phe Ser Ser Met | Ser | Gly Thr Val |
| 3110 | | 3115 | | 3120 | |
| Gly Ala | Ala Gly Gln Ala | Asn | Tyr Ala Ala Ala | Asn | Ala Phe Leu |
| 3125 | | 3130 | | 3135 | |
| Asp Ala | Leu Ala Glu Gln | Arg | Arg Ala Asp Gly | Leu | Ala Ala Thr |
| 3140 | | 3145 | | 3150 | |
| Ser Leu | Ala Trp Gly Pro | Trp | Ala Glu Gly Gly | Met | Ala Ala Asp |
| 3155 | | 3160 | | 3165 | |
| Ala Ala | Leu Glu Ala Arg | Met | Arg Arg Gly Gly | Val | Pro Pro Met |
| 3170 | | 3175 | | 3180 | |
| Asp Ala | Glu Leu Ala Leu | Ser | Ala Leu Arg Gln | Ala | Ile Gly Ser |
| 3185 | | 3190 | | 3195 | |
| Ala Asp | Ala Ala Leu Thr | Ile | Val Asp Phe Asp | Trp | Ala Arg Phe |
| 3200 | | 3205 | | 3210 | |
| Ala Pro | Gly Phe Thr Ala | Val | Arg Ala Gly Asn | Leu | Leu Ala Glu |
| 3215 | | 3220 | | 3225 | |
| Leu Pro | Glu Ala Ala Ala | Val | Met Arg Gly Pro | Glu | Asn Ala Asp |
| 3230 | | 3235 | | 3240 | |
| Ser Arg | Pro Glu His Ala | Asp | Ser Ser Leu Ala | Leu | Arg Leu Gln |
| 3245 | | 3250 | | 3255 | |
| Gly Met | Ala Gln Ala Asp | Gln | Glu Pro Phe Leu | Leu | Glu Leu Val |
| 3260 | | 3265 | | 3270 | |
| Arg Ala | Gln Val Ala Glu | Val | Leu Gly His Ser | Gly | Ala Glu Asp |
| 3275 | | 3280 | | 3285 | |
| Ile Glu | Ala Gly Arg Ala | Phe | Arg Glu Ile Gly | Phe | Asp Ser Leu |
| 3290 | | 3295 | | 3300 | |
| Thr Ala | Val Glu Leu Arg | Asn | Arg Leu Gly Ala | Ala | Ala Glu Leu |
| 3305 | | 3310 | | 3315 | |
| Arg Leu | Pro Ala Thr Leu | Val | Tyr Asp Tyr Pro | Thr | Pro Ala Ala |
| 3320 | | 3325 | | 3330 | |
| Leu Ala | Val His Leu Arg | Thr | Glu Leu Leu Gly | Lys | Gln Val Val |
| 3335 | | 3340 | | 3345 | |
| Val Ser | Gly Pro Val Ser | Lys | Val Val Asp Asp | Asp | Pro Ile Ala |
| 3350 | | 3355 | | 3360 | |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Thr | Leu | Gly | Asp | Pro | Ile | Glu |
| 3665 | | | | | | 3670 | | | | | 3675 | | | |
| Ala | Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Gln | Asp | Arg | Pro | Ala | Asp |
| 3680 | | | | | | 3685 | | | | | 3690 | | | |
| Arg | Pro | Leu | Gln | Leu | Gly | Ser | Ile | Lys | Ser | Asn | Ile | Gly | His | Thr |
| 3695 | | | | | | 3700 | | | | | 3705 | | | |
| Gln | Ala | Ala | Ala | Gly | Val | Ala | Gly | Val | Ile | Lys | Met | Val | Leu | Ala |
| 3710 | | | | | | 3715 | | | | | 3720 | | | |
| Met | Glu | His | Gly | Val | Leu | Pro | Gln | Ser | Leu | His | Ile | Asp | Ala | Pro |
| 3725 | | | | | | 3730 | | | | | 3735 | | | |
| Ser | Pro | Gln | Val | Asp | Trp | Glu | Ala | Gly | Asp | Ile | Ala | Leu | Leu | Thr |
| 3740 | | | | | | 3745 | | | | | 3750 | | | |
| Glu | Gln | Arg | Gln | Trp | Pro | Glu | Thr | Gly | Arg | Pro | Arg | Arg | Ala | Gly |
| 3755 | | | | | | 3760 | | | | | 3765 | | | |
| Val | Ser | Ser | Phe | Gly | Phe | Ser | Gly | Thr | Asn | Ala | His | Thr | Ile | Ile |
| 3770 | | | | | | 3775 | | | | | 3780 | | | |
| Glu | Gln | Ala | Pro | Ala | Ser | Thr | Glu | Thr | Asp | Arg | Ala | Glu | Ser | Gly |
| 3785 | | | | | | 3790 | | | | | 3795 | | | |
| Ser | Val | Glu | Pro | Asp | Phe | Val | Pro | Leu | Met | Leu | Ser | Ala | Lys | Ser |
| 3800 | | | | | | 3805 | | | | | 3810 | | | |
| Asp | Val | Ala | Leu | Arg | Ala | Gln | Ala | Ala | Ser | Leu | Arg | Ala | Arg | Leu |
| 3815 | | | | | | 3820 | | | | | 3825 | | | |
| Ile | Ala | Ala | Pro | Asp | Met | Arg | Leu | Ser | Asp | Val | Gly | Ser | Thr | Leu |
| 3830 | | | | | | 3835 | | | | | 3840 | | | |
| Thr | Thr | Gly | Arg | Ser | Ala | Phe | Glu | Arg | Arg | Ala | Ala | Leu | Val | Ala |
| 3845 | | | | | | 3850 | | | | | 3855 | | | |
| Gly | Gly | Arg | Glu | Gly | Leu | Leu | Ala | Gly | Leu | Glu | Ala | Leu | Ala | Asp |
| 3860 | | | | | | 3865 | | | | | 3870 | | | |
| Gly | Gly | Ser | Ala | Ala | Gly | Leu | Val | Glu | Gly | Ser | Pro | Val | Ser | Gly |
| 3875 | | | | | | 3880 | | | | | 3885 | | | |
| Lys | Leu | Ala | Phe | Leu | Phe | Thr | Gly | Gln | Gly | Ser | Gln | Arg | Leu | Gly |
| 3890 | | | | | | 3895 | | | | | 3900 | | | |
| Met | Gly | Arg | Glu | Leu | Tyr | Glu | Ala | Tyr | Pro | Val | Phe | Ala | Asp | Ala |
| 3905 | | | | | | 3910 | | | | | 3915 | | | |
| Leu | Asp | Ala | Val | Cys | Val | Arg | Leu | Glu | Leu | Pro | Leu | Met | Asp | Val |
| 3920 | | | | | | 3925 | | | | | 3930 | | | |
| Leu | Phe | Gly | Ala | Asp | Ala | Gly | Leu | Leu | Asn | Glu | Thr | Ala | Tyr | Thr |
| 3935 | | | | | | 3940 | | | | | 3945 | | | |
| Gln | Pro | Ala | Leu | Phe | Ala | Val | Glu | Val | Ala | Leu | Phe | Arg | Leu | Val |
| 3950 | | | | | | 3955 | | | | | 3960 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Glu | Ser | Trp | Gly | Leu | Arg | Pro | Asp | Phe | Leu | Ala | Gly | His | Ser | Ile |
| 3965 | | | | | | 3970 | | | | | 3975 | | | |
| Gly | Glu | Ile | Ala | Ala | Ala | His | Val | Ala | Gly | Val | Leu | Ser | Leu | Asp |
| 3980 | | | | | | 3985 | | | | | 3990 | | | |
| Asp | Ala | Cys | Ala | Leu | Val | Glu | Ala | Arg | Gly | Arg | Leu | Met | Gly | Ala |
| 3995 | | | | | | 4000 | | | | | 4005 | | | |
| Leu | Pro | Ala | Gly | Gly | Val | Met | Ile | Ala | Val | Gln | Ala | Ser | Glu | Asp |
| 4010 | | | | | | 4015 | | | | | 4020 | | | |
| Glu | Val | Leu | Pro | Leu | Leu | Thr | Asp | Arg | Val | Ser | Ile | Ala | Ala | Ile |
| 4025 | | | | | | 4030 | | | | | 4035 | | | |
| Asn | Gly | Pro | Gln | Ser | Val | Val | Ile | Ala | Gly | Asp | Glu | Ala | Asp | Ala |
| 4040 | | | | | | 4045 | | | | | 4050 | | | |
| Val | Ala | Ile | Val | Glu | Ser | Phe | Thr | Gly | Arg | Lys | Ser | Lys | Arg | Leu |
| 4055 | | | | | | 4060 | | | | | 4065 | | | |
| Ser | Val | Ser | His | Ala | Phe | His | Ser | Pro | His | Met | Asp | Gly | Met | Leu |
| 4070 | | | | | | 4075 | | | | | 4080 | | | |
| Glu | Asp | Phe | Arg | Val | Val | Ala | Glu | Gly | Leu | Ser | Tyr | Asp | Ala | Pro |
| 4085 | | | | | | 4090 | | | | | 4095 | | | |
| Arg | Ile | Pro | Val | Val | Ser | Asn | Leu | Thr | Gly | Ala | Leu | Val | Thr | Asp |
| 4100 | | | | | | 4105 | | | | | 4110 | | | |
| Glu | Met | Gly | Ser | Ala | Asp | Phe | Trp | Val | Arg | His | Val | Arg | Glu | Ala |
| 4115 | | | | | | 4120 | | | | | 4125 | | | |
| Val | Arg | Phe | Leu | Asp | Gly | Ile | Arg | Ala | Leu | Glu | Ala | Ala | Gly | Val |
| 4130 | | | | | | 4135 | | | | | 4140 | | | |
| Thr | Thr | Tyr | Val | Glu | Leu | Gly | Pro | Asp | Gly | Val | Leu | Ser | Ala | Met |
| 4145 | | | | | | 4150 | | | | | 4155 | | | |
| Ala | Gln | Glu | Cys | Val | Thr | Glu | Gly | Gly | Ala | Ala | Phe | Val | Pro | Val |
| 4160 | | | | | | 4165 | | | | | 4170 | | | |
| Leu | Arg | Lys | Gly | Arg | Pro | Glu | Ala | Glu | Thr | Val | Met | Ala | Thr | Leu |
| 4175 | | | | | | 4180 | | | | | 4185 | | | |
| Gly | Gln | Ala | His | Val | Arg | Gly | Val | Ala | Val | Asp | Trp | His | Ser | Val |
| 4190 | | | | | | 4195 | | | | | 4200 | | | |
| Tyr | Gly | Thr | Gly | Ala | Gln | Arg | Val | Asp | Leu | Pro | Thr | Tyr | Ser | Phe |
| 4205 | | | | | | 4210 | | | | | 4215 | | | |
| Gln | Arg | Gln | Arg | Tyr | Trp | Pro | Ala | Ala | Ser | Ser | Thr | Ala | Gly | Gly |
| 4220 | | | | | | 4225 | | | | | 4230 | | | |
| Ser | Val | Asp | Arg | Ser | Val | Asp | Ala | Val | Asp | Ala | Arg | Phe | Trp | Asp |
| 4235 | | | | | | 4240 | | | | | 4245 | | | |
| Ala | Val | Glu | Arg | Glu | Asp | Leu | Ala | Ser | Leu | Ala | Ala | Glu | Leu | Asp |
| 4250 | | | | | | 4255 | | | | | 4260 | | | |

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Leu | Asp | Asp | Asp | Ala | Pro | Phe | Ser | Glu | Leu | Ala | Pro | Ala | Leu | Ser | 4265 | 4270 | 4275 |
| Ala | Trp | Arg | Arg | Glu | Arg | Arg | Ala | Leu | Ser | Glu | Val | Asp | Gly | Trp | 4280 | 4285 | 4290 |
| Arg | Tyr | Arg | Val | Ser | Trp | Lys | Pro | Leu | Ala | Asp | Val | Ser | Ala | Ser | 4295 | 4300 | 4305 |
| Gly | Leu | Ser | Gly | Ser | Trp | Val | Val | Ile | Ser | Pro | Ala | Gly | Gly | Val | 4310 | 4315 | 4320 |
| Asp | Asp | Ser | Ala | Val | Val | Gly | Ala | Leu | Val | Gly | Arg | Gly | Ala | Glu | 4325 | 4330 | 4335 |
| Val | Arg | Arg | Val | Val | Val | Glu | Ala | Gly | Val | Asp | Arg | Ser | Ala | Leu | 4340 | 4345 | 4350 |
| Ala | Gly | Leu | Leu | Ala | Asp | Ala | Gly | Ser | Ala | Ala | Gly | Val | Val | Ser | 4355 | 4360 | 4365 |
| Leu | Leu | Gly | Leu | Asp | Glu | Ser | Glu | Gly | Leu | Leu | Gly | Thr | Val | Gly | 4370 | 4375 | 4380 |
| Leu | Val | Gln | Ala | Leu | Gly | Asp | Ala | Gly | Val | Glu | Ala | Pro | Leu | Trp | 4385 | 4390 | 4395 |
| Cys | Leu | Thr | Arg | Gly | Ala | Val | Ser | Val | Gly | Arg | Ser | Asp | Arg | Leu | 4400 | 4405 | 4410 |
| Val | Ser | Pro | Val | Gln | Ala | Gln | Val | Trp | Gly | Leu | Gly | Arg | Val | Ala | 4415 | 4420 | 4425 |
| Ala | Leu | Glu | Val | Pro | Glu | Arg | Trp | Gly | Gly | Leu | Ile | Asp | Leu | Pro | 4430 | 4435 | 4440 |
| Glu | Val | Leu | Asp | Glu | Arg | Ala | Val | Ser | Arg | Leu | Val | Gly | Val | Leu | 4445 | 4450 | 4455 |
| Ser | Gly | Gly | Gly | Ser | Gly | Glu | Asp | Gln | Val | Ala | Val | Arg | Ser | Ser | 4460 | 4465 | 4470 |
| Gly | Val | Phe | Gly | Arg | Arg | Leu | Val | Arg | Ala | Pro | Arg | Ala | Glu | Gly | 4475 | 4480 | 4485 |
| Ala | Ser | Ala | Trp | Ser | Pro | Thr | Gly | Thr | Val | Leu | Val | Thr | Gly | Gly | 4490 | 4495 | 4500 |
| Thr | Gly | Val | Leu | Gly | Gly | Arg | Val | Ala | Arg | Trp | Leu | Ala | Gly | Ala | 4505 | 4510 | 4515 |
| Gly | Ala | Glu | Arg | Leu | Val | Leu | Thr | Ser | Arg | Arg | Gly | Pro | Asp | Ala | 4520 | 4525 | 4530 |
| Pro | Gly | Ala | Ala | Glu | Leu | Val | Glu | Glu | Leu | Ala | Gly | Ser | Gly | Val | 4535 | 4540 | 4545 |
| Glu | Val | Ser | Val | Val | Ala | Cys | Asp | Ala | Ala | Asp | Arg | Asp | Ala | Leu | 4550 | 4555 | 4560 |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Arg | Ala | Leu | Leu | Ser | Ala | Glu | Ala | Gly | Thr | Leu | Thr | Ala | Val | Ile |
| 4565 | | | | | | 4570 | | | | | 4575 | | | |
| His | Thr | Ala | Gly | Val | Leu | Asp | Asp | Gly | Val | Leu | Asp | Ala | Leu | Thr |
| 4580 | | | | | | 4585 | | | | | 4590 | | | |
| Pro | Asp | Arg | Ile | Asp | Ser | Val | Leu | Arg | Ala | Lys | Ala | Val | Ser | Ala |
| 4595 | | | | | | 4600 | | | | | 4605 | | | |
| Ile | Asn | Leu | His | Glu | Leu | Thr | Ala | Glu | Leu | Gly | Ile | Glu | Leu | Ser |
| 4610 | | | | | | 4615 | | | | | 4620 | | | |
| Ala | Phe | Val | Leu | Phe | Ser | Ser | Val | Thr | Gly | Thr | Trp | Gly | Thr | Ala |
| 4625 | | | | | | 4630 | | | | | 4635 | | | |
| Gly | Gln | Ala | Asn | Tyr | Ala | Ala | Ala | Asn | Ala | Tyr | Leu | Asp | Ala | Leu |
| 4640 | | | | | | 4645 | | | | | 4650 | | | |
| Ala | Glu | Gln | Arg | Arg | Ala | Asp | Gly | Leu | Ala | Ala | Thr | Ser | Ile | Ala |
| 4655 | | | | | | 4660 | | | | | 4665 | | | |
| Trp | Gly | Pro | Trp | Ala | Glu | Gly | Gly | Met | Ala | Ala | Asp | Ala | Ala | Leu |
| 4670 | | | | | | 4675 | | | | | 4680 | | | |
| Glu | Ala | Arg | Met | Arg | Arg | Gly | Gly | Val | Pro | Pro | Met | Lys | Gly | Glu |
| 4685 | | | | | | 4690 | | | | | 4695 | | | |
| Ala | Ala | Val | Asn | Ala | Leu | Gln | Arg | Ala | Leu | Asn | Ala | Asn | Asp | Thr |
| 4700 | | | | | | 4705 | | | | | 4710 | | | |
| Val | Val | Thr | Val | Val | Asp | Val | Glu | Trp | Glu | Arg | Phe | Ala | Pro | Gly |
| 4715 | | | | | | 4720 | | | | | 4725 | | | |
| Phe | Thr | Ala | Ala | Arg | Ala | Ser | Thr | Leu | Leu | Ala | Glu | Leu | Pro | Glu |
| 4730 | | | | | | 4735 | | | | | 4740 | | | |
| Ala | Gln | Arg | Ala | Leu | Ala | Pro | Gln | Glu | Gly | Asp | Glu | Gly | Gln | Asp |
| 4745 | | | | | | 4750 | | | | | 4755 | | | |
| Asp | Gly | Ala | Val | His | Gly | Arg | Gly | Gly | His | Ser | Leu | Ala | Glu | Arg |
| 4760 | | | | | | 4765 | | | | | 4770 | | | |
| Leu | Ala | Glu | Leu | Ser | Ala | Ala | Glu | Arg | Asp | Arg | Leu | Leu | Leu | Gly |
| 4775 | | | | | | 4780 | | | | | 4785 | | | |
| Leu | Val | Arg | Lys | Glu | Val | Ala | Ala | Val | Leu | Gly | His | Ala | Gly | Val |
| 4790 | | | | | | 4795 | | | | | 4800 | | | |
| Glu | Ser | Ile | Gly | Ala | Ala | Arg | Ala | Phe | Lys | Glu | Leu | Gly | Phe | Asp |
| 4805 | | | | | | 4810 | | | | | 4815 | | | |
| Ser | Leu | Thr | Ala | Val | Glu | Leu | Arg | Asn | Arg | Leu | Gly | Ala | Val | Thr |
| 4820 | | | | | | 4825 | | | | | 4830 | | | |
| Gly | Leu | Arg | Leu | Pro | Ala | Thr | Leu | Ile | Tyr | Asp | Tyr | Pro | Thr | Ser |
| 4835 | | | | | | 4840 | | | | | 4845 | | | |
| Gly | Ala | Leu | Ala | Glu | Tyr | Leu | Arg | Gly | Glu | Leu | Leu | Gly | Thr | Gln |
| 4850 | | | | | | 4855 | | | | | 4860 | | | |

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|---|------|------|------|
| Ala Val Val Ser Gly Pro Val Ser Asn Ala Val Ala Val Asp Asp | 4865 | 4870 | 4875 |
| Asp Pro Ile Ala Ile Val Ala Met Ser Cys Arg Phe Pro Gly Gly | 4880 | 4885 | 4890 |
| Val Arg Thr Pro Glu Asp Leu Trp Gln Leu Leu Ala Thr Gly Arg | 4895 | 4900 | 4905 |
| Asp Ala Ile Gly Glu Phe Pro Glu Asp Arg Gly Trp Asp Ala Glu | 4910 | 4915 | 4920 |
| Ala Leu Phe Gly Pro Gln Phe Glu Gln Asp Ala Pro Tyr Ala Arg | 4925 | 4930 | 4935 |
| Glu Gly Gly Phe Leu Tyr Asp Val Ala Asp Phe Asp Pro Ala Phe | 4940 | 4945 | 4950 |
| Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln | 4955 | 4960 | 4965 |
| Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Phe Glu Arg Ala Gly | 4970 | 4975 | 4980 |
| Ile Asp Pro Leu Ser Val Arg Gly Ser Gln Ala Gly Val Phe Val | 4985 | 4990 | 4995 |
| Gly Thr Asn Gly Gln Asp Tyr Leu Ser Leu Val Leu Asn Ser Ala | 5000 | 5005 | 5010 |
| Asp Gly Gly Asp Gly Phe Met Ser Thr Gly Asn Ser Ala Ser Val | 5015 | 5020 | 5025 |
| Val Ser Gly Arg Leu Ser Tyr Val Phe Gly Leu Glu Gly Pro Ala | 5030 | 5035 | 5040 |
| Val Thr Val Asp Thr Ala Cys Ser Ala Ser Leu Val Ala Leu His | 5045 | 5050 | 5055 |
| Leu Ala Val Gln Ala Leu Arg Asn Gly Glu Cys Ser Leu Ala Leu | 5060 | 5065 | 5070 |
| Ala Gly Gly Val Thr Val Met Ser Thr Pro Gly Ala Phe Ala Glu | 5075 | 5080 | 5085 |
| Phe Ser Arg Gln Arg Gly Leu Ala Glu Asp Gly Arg Ile Lys Ala | 5090 | 5095 | 5100 |
| Phe Ala Ala Ala Ala Asp Gly Thr Gly Trp Gly Glu Gly Val Gly | 5105 | 5110 | 5115 |
| Met Leu Leu Val Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly His | 5120 | 5125 | 5130 |
| Pro Val Leu Ala Leu Val Arg Gly Ser Ala Val Asn Gln Asp Gly | 5135 | 5140 | 5145 |
| Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg | 5150 | 5155 | 5160 |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|--|
| Val | Ile | Arg | Ala | Ala | Leu | Ala | Ser | Ala | Gly | Leu | Ala | Pro | Gly | Asp | |
| 5165 | | | | | | 5170 | | | | | 5175 | | | | |
| Ile | Asp | Ala | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Lys | Leu | Gly | Asp | |
| 5180 | | | | | | 5185 | | | | | 5190 | | | | |
| Pro | Ile | Glu | Ala | Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Gln | Asp | Arg | |
| 5195 | | | | | | 5200 | | | | | 5205 | | | | |
| Pro | Ala | Asp | Arg | Pro | Leu | Gln | Leu | Gly | Ser | Ile | Lys | Ser | Asn | Ile | |
| 5210 | | | | | | 5215 | | | | | 5220 | | | | |
| Gly | His | Thr | Gln | Ala | Ala | Ala | Gly | Val | Ala | Gly | Leu | Met | Lys | Met | |
| 5225 | | | | | | 5230 | | | | | 5235 | | | | |
| Val | Leu | Ala | Met | Gln | His | Gly | Val | Leu | Pro | Gln | Thr | Leu | His | Val | |
| 5240 | | | | | | 5245 | | | | | 5250 | | | | |
| Asp | Glu | Pro | Thr | Pro | His | Val | Asp | Trp | Ser | Ala | Gly | Asp | Ile | Ala | |
| 5255 | | | | | | 5260 | | | | | 5265 | | | | |
| Leu | Leu | Thr | Glu | Arg | Arg | Glu | Trp | Pro | Glu | Thr | Gly | Arg | Pro | Arg | |
| 5270 | | | | | | 5275 | | | | | 5280 | | | | |
| Arg | Ala | Gly | Ile | Ser | Ser | Phe | Gly | Val | Ser | Gly | Thr | Asn | Ala | His | |
| 5285 | | | | | | 5290 | | | | | 5295 | | | | |
| Thr | Ile | Leu | Glu | Gln | Ala | Pro | Pro | Leu | Thr | Glu | Lys | Asp | Glu | Ala | |
| 5300 | | | | | | 5305 | | | | | 5310 | | | | |
| Glu | Ala | Ala | Arg | Pro | Glu | Thr | Gly | Ser | Ala | Val | Ser | Ala | Trp | Pro | |
| 5315 | | | | | | 5320 | | | | | 5325 | | | | |
| Leu | Ala | Gly | Lys | Thr | Glu | Ala | Gly | Leu | Arg | Glu | Gln | Ala | Glu | Arg | |
| 5330 | | | | | | 5335 | | | | | 5340 | | | | |
| Leu | Leu | Ala | His | Ile | Asp | Ala | His | Ser | Glu | Leu | Arg | Pro | Val | Asp | |
| 5345 | | | | | | 5350 | | | | | 5355 | | | | |
| Val | Gly | His | Ser | Leu | Ala | Thr | Gly | Arg | Ala | Ala | Phe | Asp | His | Arg | |
| 5360 | | | | | | 5365 | | | | | 5370 | | | | |
| Ala | Val | Leu | Val | Ala | Gly | Asp | Asp | Arg | Ser | Glu | Phe | Arg | Arg | Ala | |
| 5375 | | | | | | 5380 | | | | | 5385 | | | | |
| Leu | Ala | Ala | Leu | Ala | Ser | Gly | Glu | Ser | Val | Ala | Gln | Val | Val | Gln | |
| 5390 | | | | | | 5395 | | | | | 5400 | | | | |
| Gly | Ile | Ala | Arg | Pro | Asp | Gln | Gln | Val | Ala | Phe | Leu | Phe | Thr | Gly | |
| 5405 | | | | | | 5410 | | | | | 5415 | | | | |
| Gln | Gly | Ser | Gln | Arg | Leu | Gly | Met | Gly | Arg | Glu | Leu | Tyr | Glu | Thr | |
| 5420 | | | | | | 5425 | | | | | 5430 | | | | |
| Tyr | Pro | Val | Phe | Ala | Asp | Ala | Leu | Asp | Ala | Val | Cys | Ala | Arg | Leu | |
| 5435 | | | | | | 5440 | | | | | 5445 | | | | |
| Glu | Leu | Pro | Leu | Lys | Asp | Val | Leu | Phe | Gly | Gly | Asp | Ala | Asp | Arg | |
| 5450 | | | | | | 5455 | | | | | 5460 | | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Leu | Asn | Glu | Thr | Ala | Tyr | Thr | Gln | Pro | Ala | Leu | Phe | Ala | Val | Glu |
| 5465 | | | | | | 5470 | | | | | 5475 | | | |
| Val | Ala | Leu | Phe | Arg | Leu | Val | Glu | Ser | Trp | Gly | Val | Arg | Pro | Asp |
| 5480 | | | | | | 5485 | | | | | 5490 | | | |
| Phe | Leu | Ala | Gly | His | Ser | Ile | Gly | Glu | Ile | Ala | Ala | Ala | His | Val |
| 5495 | | | | | | 5500 | | | | | 5505 | | | |
| Ala | Gly | Val | Phe | Ser | Leu | Asp | Asp | Ala | Cys | Ala | Leu | Val | Glu | Ala |
| 5510 | | | | | | 5515 | | | | | 5520 | | | |
| Arg | Gly | Arg | Leu | Met | Gln | Ala | Leu | Pro | Thr | Gly | Gly | Val | Met | Ile |
| 5525 | | | | | | 5530 | | | | | 5535 | | | |
| Ala | Val | Gln | Ala | Ser | Glu | Ala | Glu | Val | Leu | Pro | Leu | Leu | Thr | Glu |
| 5540 | | | | | | 5545 | | | | | 5550 | | | |
| Arg | Val | Ser | Ile | Ala | Ala | Ile | Asn | Gly | Pro | Gln | Ser | Val | Val | Ile |
| 5555 | | | | | | 5560 | | | | | 5565 | | | |
| Ala | Gly | Asp | Glu | Ala | Asp | Ala | Val | Ala | Ile | Val | Asp | Ala | Phe | Asn |
| 5570 | | | | | | 5575 | | | | | 5580 | | | |
| Asp | Arg | Lys | Ser | Lys | Arg | Leu | Ala | Val | Ser | His | Ala | Phe | His | Ser |
| 5585 | | | | | | 5590 | | | | | 5595 | | | |
| Pro | His | Met | Asp | Gly | Met | Leu | Ala | Asp | Phe | Arg | Lys | Val | Ala | Glu |
| 5600 | | | | | | 5605 | | | | | 5610 | | | |
| Glu | Leu | Ser | Tyr | Glu | Ala | Pro | Arg | Ile | Pro | Ile | Val | Ser | Asn | Leu |
| 5615 | | | | | | 5620 | | | | | 5625 | | | |
| Thr | Gly | Ala | Leu | Val | Thr | Asp | Glu | Met | Gly | Ser | Ala | Asp | Phe | Trp |
| 5630 | | | | | | 5635 | | | | | 5640 | | | |
| Val | Arg | His | Val | Arg | Glu | Ala | Val | Arg | Phe | Leu | Asp | Gly | Ile | Arg |
| 5645 | | | | | | 5650 | | | | | 5655 | | | |
| Ala | Leu | Glu | Ala | Ala | Gly | Val | Thr | Val | Tyr | Val | Glu | Leu | Gly | Pro |
| 5660 | | | | | | 5665 | | | | | 5670 | | | |
| Asp | Gly | Val | Leu | Ser | Ala | Met | Ala | Gln | Glu | Cys | Val | Thr | Gly | Glu |
| 5675 | | | | | | 5680 | | | | | 5685 | | | |
| Gly | Ala | Ala | Phe | Val | Pro | Ala | Leu | Arg | Lys | Gly | Arg | Pro | Glu | Ala |
| 5690 | | | | | | 5695 | | | | | 5700 | | | |
| Glu | Thr | Ile | Thr | Ala | Ala | Leu | Ala | His | Ala | His | Thr | His | Gly | Ile |
| 5705 | | | | | | 5710 | | | | | 5715 | | | |
| Ala | Val | Asp | Trp | Gln | Ala | Tyr | Phe | Ala | Gly | Thr | Gly | Ala | Gln | Arg |
| 5720 | | | | | | 5725 | | | | | 5730 | | | |
| Val | Asp | Leu | Pro | Thr | Tyr | Ala | Phe | Gln | Arg | Gln | Arg | Tyr | Trp | Val |
| 5735 | | | | | | 5740 | | | | | 5745 | | | |
| Asp | Ser | Phe | Ala | Glu | Phe | Asp | Asp | Val | Ala | Ser | Ala | Gly | Ile | Gly |
| 5750 | | | | | | 5755 | | | | | 5760 | | | |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Ser | Ala | Gly | His | Pro | Leu | Leu | Gly | Ala | Ala | Val | Glu | Leu | Pro | Asp |
| 5765 | | | | | | 5770 | | | | | 5775 | | | |
| Ser | Asp | Gly | Phe | Leu | Phe | Thr | Gly | Arg | Leu | Ser | Leu | Arg | Thr | His |
| 5780 | | | | | | 5785 | | | | | 5790 | | | |
| Pro | Trp | Leu | Ala | Asp | His | Val | Val | Ala | Asp | Thr | Val | Val | Val | Pro |
| 5795 | | | | | | 5800 | | | | | 5805 | | | |
| Gly | Ala | Ala | Phe | Val | Glu | Leu | Ala | Val | Arg | Ala | Gly | Asp | Glu | Val |
| 5810 | | | | | | 5815 | | | | | 5820 | | | |
| Gly | Cys | Glu | Glu | Val | Glu | Glu | Leu | Val | Leu | Glu | Ala | Pro | Leu | Val |
| 5825 | | | | | | 5830 | | | | | 5835 | | | |
| Leu | Pro | Glu | Lys | Gly | Ala | Val | Gln | Leu | Arg | Leu | Ser | Val | Gly | Gly |
| 5840 | | | | | | 5845 | | | | | 5850 | | | |
| Ala | Asp | Asp | Gln | Gly | Arg | Arg | Ser | Val | His | Val | His | Ser | Arg | Val |
| 5855 | | | | | | 5860 | | | | | 5865 | | | |
| Glu | Ala | Ala | Asp | Gly | Gly | Gly | Val | Pro | Gly | Gly | Ala | Trp | Ser | Arg |
| 5870 | | | | | | 5875 | | | | | 5880 | | | |
| Asn | Ala | Thr | Gly | Leu | Leu | Ser | Thr | Gly | Gly | Ser | Gly | Ser | Asp | Val |
| 5885 | | | | | | 5890 | | | | | 5895 | | | |
| Asp | Ser | Gly | Thr | Val | Ile | Gly | Glu | Trp | Pro | Pro | Ala | Gly | Ala | Glu |
| 5900 | | | | | | 5905 | | | | | 5910 | | | |
| Gln | Val | Asp | Val | Thr | Ala | Val | Arg | Glu | Arg | Leu | Ala | Ala | Ala | Gly |
| 5915 | | | | | | 5920 | | | | | 5925 | | | |
| Leu | His | His | Gly | Pro | Gly | Phe | Arg | Thr | Leu | Thr | Glu | Val | Trp | Val |
| 5930 | | | | | | 5935 | | | | | 5940 | | | |
| Arg | Gly | Glu | Glu | Val | Phe | Ala | Glu | Ala | Arg | Leu | Ser | Asp | Glu | Leu |
| 5945 | | | | | | 5950 | | | | | 5955 | | | |
| Ser | Ala | Ser | Ala | Gly | Arg | Phe | Ala | Leu | His | Pro | Thr | Leu | Leu | Asp |
| 5960 | | | | | | 5965 | | | | | 5970 | | | |
| Ala | Ala | Ser | Gln | Ala | Leu | Ala | Ala | Gly | Thr | Thr | Ala | Ala | Ala | Ser |
| 5975 | | | | | | 5980 | | | | | 5985 | | | |
| Gly | Ile | Gly | Gly | Ala | Gly | Arg | Leu | Pro | Gln | Ala | Trp | Arg | Gly | Val |
| 5990 | | | | | | 5995 | | | | | 6000 | | | |
| Arg | Leu | His | Ala | Gly | Gly | Ala | Asp | Ala | Leu | Arg | Leu | Arg | Ile | Thr |
| 6005 | | | | | | 6010 | | | | | 6015 | | | |
| Ala | Gly | Gly | Gln | Asp | Thr | Val | Ser | Val | Val | Leu | Thr | Asp | Thr | Gln |
| 6020 | | | | | | 6025 | | | | | 6030 | | | |
| Gly | Ala | Pro | Val | Ala | Thr | Val | Gly | Ser | Leu | Val | Thr | Glu | Ala | Val |
| 6035 | | | | | | 6040 | | | | | 6045 | | | |
| Asp | Ala | Glu | Arg | Tyr | Ala | Ala | Val | Pro | Asp | Gly | Ser | His | Asp | Ser |
| 6050 | | | | | | 6055 | | | | | 6060 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Leu | Phe | Arg | Leu | Asp | Trp | Val | Arg | Thr | Thr | Ala | Pro | Gly | Arg | Pro |
| 6065 | | | | | | 6070 | | | | | 6075 | | | |
| Thr | Ser | Ala | Asp | Phe | Ala | Val | Leu | Gly | Thr | Pro | Gly | Thr | Gly | Ile |
| 6080 | | | | | | 6085 | | | | | 6090 | | | |
| Gly | Ala | Arg | Ile | Gly | Gly | Asp | Glu | Gly | Phe | Leu | Val | Gly | Ala | Leu |
| 6095 | | | | | | 6100 | | | | | 6105 | | | |
| Glu | Arg | Ala | Gly | Leu | Thr | Ala | Glu | Thr | Tyr | Asp | Gly | Leu | Ala | Ala |
| 6110 | | | | | | 6115 | | | | | 6120 | | | |
| Leu | Asp | Ser | Ala | Val | Ala | Ala | Gly | Met | Ala | Met | Pro | Glu | Thr | Val |
| 6125 | | | | | | 6130 | | | | | 6135 | | | |
| Val | Val | Ser | Phe | Ala | Ala | Ala | Leu | Asp | Pro | Ala | Ser | Asp | Ser | Ala |
| 6140 | | | | | | 6145 | | | | | 6150 | | | |
| Ala | Asp | Thr | Val | Ala | Ser | Val | Asp | Ser | Ala | Glu | Glu | Val | Ala | Arg |
| 6155 | | | | | | 6160 | | | | | 6165 | | | |
| Leu | Ala | Gln | Ala | Val | Arg | Glu | Ala | Thr | His | Arg | Ala | Leu | Ala | Thr |
| 6170 | | | | | | 6175 | | | | | 6180 | | | |
| Val | Gln | Gly | Trp | Leu | Asp | Asn | Gly | Arg | Phe | Ala | Gly | Ala | Arg | Leu |
| 6185 | | | | | | 6190 | | | | | 6195 | | | |
| Val | Val | Val | Thr | Arg | Gly | Ala | Val | Ala | Thr | Gly | Arg | Asp | Thr | Glu |
| 6200 | | | | | | 6205 | | | | | 6210 | | | |
| Val | Glu | Asp | Leu | Ala | His | Ala | Pro | Val | Trp | Gly | Leu | Leu | Arg | Ala |
| 6215 | | | | | | 6220 | | | | | 6225 | | | |
| Ala | Gln | Thr | Glu | His | Pro | Asp | Arg | Phe | Val | Leu | Val | Asp | Leu | Asp |
| 6230 | | | | | | 6235 | | | | | 6240 | | | |
| Gly | Ala | Asp | Ala | Ser | Val | Arg | Ala | Leu | Pro | Gly | Ala | Ile | Ala | Ser |
| 6245 | | | | | | 6250 | | | | | 6255 | | | |
| Gln | Glu | Ser | Glu | Leu | Ala | Val | Arg | Asp | Gly | Val | Leu | Tyr | Ala | Pro |
| 6260 | | | | | | 6265 | | | | | 6270 | | | |
| Arg | Leu | Val | Arg | Val | Gly | Ala | Glu | Ala | Val | Thr | Gly | Asp | Thr | Gly |
| 6275 | | | | | | 6280 | | | | | 6285 | | | |
| Gly | Arg | Arg | Ile | Asp | Pro | Arg | Gly | Thr | Val | Leu | Ile | Thr | Gly | Ala |
| 6290 | | | | | | 6295 | | | | | 6300 | | | |
| Ser | Gly | Gly | Leu | Ala | Gly | Leu | Phe | Ala | Arg | His | Leu | Val | Ala | Glu |
| 6305 | | | | | | 6310 | | | | | 6315 | | | |
| His | Gly | Val | Arg | His | Leu | Leu | Leu | Thr | Ser | Arg | Arg | Gly | Ala | Ala |
| 6320 | | | | | | 6325 | | | | | 6330 | | | |
| Ala | Glu | Gly | Ala | Ala | Gln | Leu | Ala | Asp | Glu | Leu | Val | Ala | Leu | Gly |
| 6335 | | | | | | 6340 | | | | | 6345 | | | |
| Ala | Gln | Val | Thr | Trp | Ala | Ala | Cys | Asp | Val | Ala | Asp | Arg | Asp | Ala |
| 6350 | | | | | | 6355 | | | | | 6360 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Leu | Ala | Ala | Leu | Leu | Ala | Ser | Val | Pro | Ala | Glu | Gln | Pro | Leu | Thr |
| 6365 | | | | | | 6370 | | | | | 6375 | | | |
| Ala | Val | Val | His | Thr | Ala | Ala | Val | Leu | Asp | Asp | Gly | Val | Val | Asp |
| 6380 | | | | | | 6385 | | | | | 6390 | | | |
| Leu | Leu | Thr | Pro | Glu | Arg | Val | Asp | Arg | Val | Leu | Arg | Pro | Lys | Ala |
| 6395 | | | | | | 6400 | | | | | 6405 | | | |
| Glu | Ala | Ala | Leu | His | Leu | His | Glu | Leu | Thr | Lys | Asp | Leu | Asp | Leu |
| 6410 | | | | | | 6415 | | | | | 6420 | | | |
| Ser | Ala | Phe | Val | Leu | Phe | Ser | Ala | Ala | Ala | Gly | Thr | Leu | Gly | Gly |
| 6425 | | | | | | 6430 | | | | | 6435 | | | |
| Ala | Gly | Gln | Ala | Asn | Tyr | Ala | Ala | Ala | Asn | Val | Phe | Leu | Asp | Ala |
| 6440 | | | | | | 6445 | | | | | 6450 | | | |
| Leu | Ala | Arg | His | Arg | Thr | Ala | Arg | Gly | Leu | Thr | Ala | Leu | Ser | Leu |
| 6455 | | | | | | 6460 | | | | | 6465 | | | |
| Val | Trp | Gly | Met | Trp | Ala | Glu | Glu | Arg | Gly | Met | Ala | Gly | Arg | Leu |
| 6470 | | | | | | 6475 | | | | | 6480 | | | |
| Thr | Glu | Ala | Glu | Leu | Gly | Arg | Ala | Gly | Arg | Gly | Gly | Val | Ala | Pro |
| 6485 | | | | | | 6490 | | | | | 6495 | | | |
| Leu | Ser | Ala | Thr | Glu | Gly | Leu | Ala | Leu | Phe | Asp | Ala | Ala | Leu | Ala |
| 6500 | | | | | | 6505 | | | | | 6510 | | | |
| Ala | Asp | Glu | Ala | Val | Leu | Val | Pro | Val | Arg | Ile | Asp | Val | Pro | Thr |
| 6515 | | | | | | 6520 | | | | | 6525 | | | |
| Leu | Arg | Ala | Arg | Ala | Ala | Asp | Gly | Gly | Ile | His | Pro | Met | Phe | Arg |
| 6530 | | | | | | 6535 | | | | | 6540 | | | |
| Gly | Leu | Val | Arg | Thr | Pro | Val | Arg | Arg | Ser | Ala | Gln | Ser | Ala | Gly |
| 6545 | | | | | | 6550 | | | | | 6555 | | | |
| Arg | Ala | Ala | Gly | Thr | Val | Pro | Thr | Asp | Gly | Ala | Gly | Glu | Arg | Thr |
| 6560 | | | | | | 6565 | | | | | 6570 | | | |
| Leu | Ala | Arg | Gln | Leu | Ala | Glu | Leu | Ser | Val | Ala | Glu | Arg | Glu | Arg |
| 6575 | | | | | | 6580 | | | | | 6585 | | | |
| Thr | Val | Leu | Asp | Leu | Val | Arg | Gly | Gln | Val | Ala | Ala | Val | Leu | Gly |
| 6590 | | | | | | 6595 | | | | | 6600 | | | |
| Tyr | Gly | Ser | Ala | Glu | His | Ile | Gly | Gly | Glu | Gln | Ala | Phe | Lys | Glu |
| 6605 | | | | | | 6610 | | | | | 6615 | | | |
| Leu | Gly | Phe | Asp | Ser | Leu | Thr | Ala | Val | Glu | Leu | Arg | Asn | Arg | Leu |
| 6620 | | | | | | 6625 | | | | | 6630 | | | |
| Gly | Ala | Ala | Gly | Gly | Leu | Arg | Leu | Pro | Ala | Thr | Leu | Ile | Tyr | Asp |
| 6635 | | | | | | 6640 | | | | | 6645 | | | |
| Tyr | Pro | Asn | Pro | Ala | Ala | Leu | Ala | Gln | His | Leu | Leu | Ser | Glu | Val |
| 6650 | | | | | | 6655 | | | | | 6660 | | | |

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|------------|-------------|-------------|-------------|-------------|-------------|------|
| tacgggcaag | ggcgcacgga | cggccggccg | ctgtggctcg | gctccttgaa | gtcgaacctc | 1140 |
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| cacggggtgc | tgccccggac | cctgcacgtc | gacgagccca | cctcgcacgt | cgactggctg | 1260 |
| acgggcgcg | tggcgctgct | gaccgagccg | gtggagtggc | cggagaccgg | gcgcccgcgc | 1320 |
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| cagcggctgg | ggatgggccc | tgagctgtac | gagacgtatc | ccgtcttcgc | gcaggccttg | 1800 |
| gacgcggtgt | gtgagcggct | ggaactaccc | ctgaagaacg | tgctgttcgg | gacggacagc | 1860 |
| gctgcgctgg | acgagacctc | gtacacgcag | cctgctctct | tcgccgttga | ggtggcgctg | 1920 |
| ttccggctcg | tggagagctg | gggcctgaag | ccggacttcc | tggccgggca | ttcgatcggg | 1980 |
| gagatcgccg | ccgcgcagtg | ggccgggggtg | ttctcgtctg | acgacgcgtg | cgcgctgggtg | 2040 |
| tcggctcgcg | gccggttgat | gggggcgctg | ccgggcgggtg | gcgtgatgat | cgcggtccag | 2100 |
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| ggtccgcagt | cggctcgtgat | cgcggggtgac | gaagccgatg | cggtagccat | cgccgagtcc | 2220 |
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| ctgccccgcg | tgaccacggc | cgagggcctg | gaactgttcg | acctcgccca | ccgcatcgac | 4980 |
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| taccccggac | cctccgccgt | cgagcccggc | cgctccttca | aggaactcgg | cttcgactcg | 5280 |
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<211> 1657

<212> PRT

<213> Streptomyces aizunensis

<400> 27

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| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Asp | Leu | Asp | Glu | Ala | Tyr | Gly | Arg | Leu | Arg | Glu | Ile | Glu | Ser | Gln | Ala |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| His | Glu | Pro | Ile | Ala | Ile | Thr | Ala | Met | Ser | Cys | Arg | Phe | Pro | Gly | Gly |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Val | Arg | Ser | Pro | Glu | Glu | Leu | Trp | Glu | Leu | Leu | Arg | Thr | Gly | Gly | Asp |
| | 50 | | | | | 55 | | | | | 60 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Ala | Leu | Thr | Ala | Phe | Pro | Ala | Asp | Arg | Gly | Trp | Asp | Leu | Asp | Asn | Leu | |
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| Phe | Ser | Asp | Asp | Pro | Asp | Asp | His | Asn | Thr | Ser | Val | Thr | Arg | Glu | Gly | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |
| Gly | Phe | Leu | Gly | Glu | Ala | Ser | Ser | Phe | Asp | Ala | Ala | Phe | Phe | Gly | Ile | |
| | | | 100 | | | | | 105 | | | | | | 110 | | |
| Ser | Pro | Arg | Glu | Ala | Met | Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | Leu | Leu | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| Glu | Thr | Ser | Trp | Glu | Ala | Phe | Glu | Arg | Ala | Gly | Ile | Asp | Pro | Gln | Ala | |
| | 130 | | | | | 135 | | | | | 140 | | | | | |
| Leu | Arg | Gly | Ser | Gln | Ser | Gly | Val | Phe | Val | Gly | Ile | Asn | Gly | Ser | Asp | |
| 145 | | | | 150 | | | | | | 155 | | | | | 160 | |
| Tyr | Leu | Thr | Pro | Leu | Leu | Glu | Ala | Ala | Glu | Asp | Tyr | Ala | Gly | His | Leu | |
| | | | | 165 | | | | | 170 | | | | | 175 | | |
| Gly | Thr | Gly | Asn | Ala | Ser | Ser | Val | Met | Ser | Gly | Arg | Leu | Ser | Tyr | Thr | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Phe | Gly | Leu | Glu | Gly | Pro | Ala | Val | Thr | Val | Asp | Thr | Ala | Cys | Ser | Ala | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| Ser | Leu | Val | Ala | Leu | His | Leu | Ala | Val | Gln | Ala | Leu | Arg | Ala | Gly | Glu | |
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| Cys | Ser | Leu | Ala | Val | Ala | Gly | Gly | Val | His | Val | Met | Ser | Thr | Pro | Gly | |
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| Leu | Phe | Val | Glu | Phe | Ser | Lys | Gln | Arg | Gly | Leu | Ser | Thr | Asp | Gly | Arg | |
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| Cys | Lys | Ala | Phe | Ala | Ala | Gly | Ala | Asp | Gly | Phe | Gly | Pro | Ala | Glu | Gly | |
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| Val | Gly | Val | Leu | Leu | Leu | Glu | Arg | Leu | Ser | Asp | Ala | Arg | Lys | Asn | Gly | |
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| Ile | Arg | Gln | Ala | Leu | Ala | Asn | Ala | Arg | Leu | Ser | Thr | Asp | Gln | Val | Asp | |
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| Val | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Ser | Leu | Gly | Asp | Pro | Ile | Glu | |
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| Ala | Gln | Ala | Leu | Ile | Ala | Thr | Tyr | Gly | Gln | Asp | Arg | Pro | Ala | Asp | Gln | |
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| Pro | Leu | Leu | Leu | Gly | Ser | Val | Lys | Ser | Asn | Ile | Gly | His | Thr | Gln | Ala | |
| | 370 | | | | | 375 | | | | | 380 | | | | | |

Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Leu Ala Met Gln His
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 Gly Val Leu Pro Gln Ser Leu His Ile Asp Glu Pro Ser Pro His Val
 405 410 415
 Asp Trp Glu Ser Gly Ala Val Ser Leu Leu Thr Glu Gln Thr Ala Trp
 420 425 430
 Pro Glu Thr Thr His Pro Arg Arg Ala Gly Val Ser Ser Phe Gly Phe
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 Ser Gly Thr Asn Ala His Val Ile Val Glu Gln Ala Pro Val Val Glu
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 Val Val Pro Val Val Pro Trp Val Leu Ser Gly Lys Ser Ala Gly Ala
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 Leu Arg Ala Gln Ala Glu Arg Leu Ser Gly Phe Leu Ala Gly Ala Ser
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 Arg Ala Gly Leu Glu His Arg Ala Val Val Leu Gly Asp His Ala Ala
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 Ile Gly His Ser Gln Gly Glu Ile Ala Ala Ala Cys Val Ala Gly Ile
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Pro Ala Lys Ala Val Arg Glu Leu Ile Ala Pro Trp Gly Glu Gly Arg
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 1010 1015 1020

| | | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|--|
| Leu | Arg | Met | Leu | Ala | Glu | Arg | Gly | Ala | Glu | Val | Arg | Thr | Val | Thr | |
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| Val | Pro | Ala | Asp | Gly | Ala | Asp | Arg | Asp | Arg | Leu | Ala | Val | Thr | Leu | |
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| Lys | Ala | Glu | Thr | Ser | Glu | Val | Ala | Pro | Ser | Gly | Val | Leu | Ser | Leu | |
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| Leu | Ala | Leu | Ala | Ala | Gly | Ala | Gly | Ala | Phe | Ala | Ala | Glu | Leu | Ala | |
| 1070 | | | | | | 1075 | | | | | 1080 | | | | |
| Leu | Cys | Gln | Ala | Leu | Gly | Asp | Ala | Asp | Val | Ala | Ala | Pro | Leu | Trp | |
| 1085 | | | | | | 1090 | | | | | 1095 | | | | |
| Cys | Val | Thr | Arg | Gly | Ala | Val | Ala | Thr | Gly | Arg | Ser | Glu | Gln | Val | |
| 1100 | | | | | | 1105 | | | | | 1110 | | | | |
| Ala | Asp | Pro | Ala | Gln | Ala | Leu | Val | Trp | Gly | Leu | Gly | Arg | Val | Ala | |
| 1115 | | | | | | 1120 | | | | | 1125 | | | | |
| Ser | Met | Glu | Gln | Gly | Gly | Arg | Trp | Gly | Gly | Leu | Leu | Asp | Leu | Pro | |
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| Ala | Gly | Asp | Gly | Ser | Glu | Asp | Gln | Val | Ala | Leu | Arg | Ala | Ser | Gly | |
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| Leu | Phe | Gly | Arg | Arg | Leu | Val | His | Ala | Pro | Leu | Ala | Asp | Thr | Ala | |
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| Gly | Thr | Gly | Ala | Leu | Gly | Ala | His | Val | Ala | Arg | Trp | Leu | Ala | Gly | |
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| Asn | Gly | Ala | Glu | His | Leu | Leu | Leu | Thr | Ser | Arg | Arg | Gly | Pro | Asp | |
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| Ala | Pro | Gly | Ala | Ala | Ala | Leu | Arg | Asp | Glu | Leu | Thr | Ala | Leu | Gly | |
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| Val | Thr | Ala | Leu | Ile | Ala | Ala | Ile | Pro | Ala | Asp | Gln | Pro | Leu | Thr | |
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| Ala | Val | Ile | His | Ala | Ala | Ala | Val | Val | Asp | Asp | Gly | Val | Ile | Glu | |
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| Thr | Leu | Ala | Pro | Glu | Gln | Val | Glu | Ala | Val | Leu | Arg | Val | Lys | Val | |
| 1295 | | | | | | 1300 | | | | | 1305 | | | | |
| Asp | Ala | Thr | Leu | Ile | Leu | His | Glu | Leu | Thr | Arg | Gly | Leu | Asp | Leu | |
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| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Ser | Ala | Phe | Val | Leu | Phe | Ser | Ser | Phe | Ala | Ala | Thr | Phe | Gly | Ala |
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| Pro | Gly | Gln | Gly | Asn | Gln | Ala | Pro | Gly | Asn | Ala | Tyr | Leu | Asp | Ala |
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| Phe | Ala | Glu | Tyr | Arg | Arg | Gly | Ser | Gly | Leu | Pro | Ala | Thr | Ser | Ile |
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| Ala | Trp | Gly | Pro | Trp | Gly | Ser | Ala | Asp | Gly | Asp | Asp | Ser | Ala | Ala |
| 1370 | | | | | | 1375 | | | | | 1380 | | | |
| Gly | Asp | Arg | Met | Arg | Arg | His | Gly | Ile | Ile | Val | Met | Ser | Pro | Glu |
| 1385 | | | | | | 1390 | | | | | 1395 | | | |
| Arg | Thr | Leu | Val | Ser | Leu | Gln | His | Ala | Leu | Asp | Arg | Asp | Glu | Thr |
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| Thr | Leu | Thr | Val | Ala | Asp | Met | Asp | Trp | Lys | Arg | Phe | Thr | Leu | Ala |
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| Phe | Thr | Ala | Asp | Arg | Asp | Arg | Pro | Leu | Leu | Leu | Glu | Leu | Pro | Glu |
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| Ala | Arg | Arg | Ile | Ile | Glu | Ser | Ala | Glu | Arg | Glu | Ser | Ala | Asp | Asp |
| 1445 | | | | | | 1450 | | | | | 1455 | | | |
| Leu | Ala | Gly | Gly | Val | Pro | Leu | Thr | Gln | Gln | Leu | Ala | Gly | Leu | Pro |
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| Glu | Val | Glu | Gln | Glu | Arg | Leu | Leu | Leu | Asp | Leu | Val | Arg | Thr | Ala |
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| Val | Ala | Ala | Val | Leu | Gly | His | Ala | Asp | Leu | Ala | Ala | Val | Glu | Ala |
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| Gly | Arg | Ala | Phe | Lys | Glu | Leu | Gly | Phe | Asp | Ser | Leu | Thr | Ser | Val |
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| Glu | Leu | Arg | Asn | Arg | Leu | Gly | Ala | Val | Ser | Gly | Leu | Lys | Leu | Pro |
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| Ala | Ser | Leu | Val | Phe | Asp | His | Pro | Thr | Pro | Ala | Ala | Val | Ala | Ala |
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| Phe | Leu | Arg | Ala | Gly | Ile | Val | Pro | Asp | Ala | Ala | Ala | Gly | Gly | Ala |
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| Pro | Leu | Leu | Glu | Glu | Leu | Asp | Lys | Leu | Glu | Ala | Val | Leu | Glu | Arg |
| 1565 | | | | | | 1570 | | | | | 1575 | | | |
| Gly | Thr | Ala | Asp | Asn | Val | Val | Arg | Ala | Arg | Val | Thr | Met | Arg | Leu |
| 1580 | | | | | | 1585 | | | | | 1590 | | | |
| Gln | Lys | Leu | Leu | Gly | Lys | Trp | Asn | Glu | Ser | Glu | Asp | Gln | Ser | Gly |
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| Ala | Glu | Val | Trp | Ala | Ala | Ala | Ala | Asn | Gly | Ser | Gly | Ser | Gly | Ile |
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Gly Ala Gly Ser Ala Asp Gly Val Leu Asp Glu Val Glu Gln Leu
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 Gln Glu Ala Ser Asp Glu Glu Leu Phe Ala Phe Ile Asn Lys Gly
 1640 1645 1650
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Val Thr Ser Pro Glu Glu Leu Trp Gln Leu Val Val Asp Gly Gly Asp
50 55 60

Ala Ile Ser Gly Phe Pro Ala Asp Arg Gly Trp Asp Met Glu Thr Val
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Tyr His Pro Asp Pro Glu His Pro Gly Thr Ser Tyr Ala Asn Gln Gly
85 90 95

Gly Phe Val Arg Asp Phe Ala Arg Phe Asp Pro Ser Leu Phe Gly Ile
100 105 110

Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu
115 120 125

Glu Thr Ser Trp Glu Ala Phe Glu Arg Ala Gly Ile Asp Pro Thr Ser
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Met Arg Gly Lys Gln Val Gly Val Phe Val Gly Thr Ser Asn His Asp
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Tyr Leu Ser Ala Leu Leu Ser Ser Ser Glu Asn Val Glu Gly Tyr Leu
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Gly Thr Gly Asn Ala Ala Ser Val Ala Ser Gly Arg Leu Ser Tyr Thr
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Phe Gly Leu Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser
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Ser Ser Val Ala Leu His Leu Ala Val Gln Ala Leu Arg Asn Gly Glu
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Cys Ser Leu Ala Leu Ala Gly Gly Ala Thr Leu Met Ser Ala Pro Gly
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Thr Phe Ile Asp Tyr Ser Lys Gln Arg Gly Leu Ala Thr Asp Gly Arg
245 250 255

Cys Lys Ala Phe Ser Pro Asp Ala Asp Gly Phe Ser Leu Ala Glu Gly
260 265 270

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| | 275 | | | | | | 280 | | | | | 285 | | | | |
| His | Pro | Val | Leu | Ala | Val | Val | Arg | Gly | Thr | Ala | Val | Asn | Gln | Asp | Gly | |
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| Ala | Ser | Asn | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln | Arg | Val | |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 | |
| Ile | Leu | Gln | Ala | Leu | Ser | Asn | Ala | Arg | Leu | Thr | Pro | Asp | Gln | Val | Asp | |
| | | | | 325 | | | | | 330 | | | | | 335 | | |
| Ala | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Gly | Leu | Gly | Asp | Pro | Ile | Glu | |
| | | | 340 | | | | | 345 | | | | | 350 | | | |
| Ala | Gln | Ala | Leu | Ile | Ala | Thr | Tyr | Gly | Gln | Asp | Arg | Pro | Asp | Gly | Arg | |
| | | 355 | | | | | 360 | | | | | 365 | | | | |
| Pro | Leu | Trp | Leu | Gly | Ser | Leu | Lys | Thr | Asn | Ile | Gly | His | Ala | Gln | Ala | |
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| Ala | Ala | Gly | Val | Ala | Gly | Val | Ile | Lys | Ser | Val | Met | Ala | Met | Arg | His | |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 | |
| Gly | Val | Leu | Pro | Arg | Thr | Leu | His | Val | Asp | Glu | Pro | Thr | Pro | Glu | Val | |
| | | | | 405 | | | | | 410 | | | | | 415 | | |
| Asp | Trp | Ser | Ala | Gly | Asp | Val | Ser | Leu | Leu | Thr | Glu | Ala | Arg | Pro | Trp | |
| | | | 420 | | | | | 425 | | | | | 430 | | | |
| Pro | Leu | Gly | Asp | Gln | Pro | Arg | Arg | Ile | Gly | Val | Ser | Ser | Phe | Gly | Met | |
| | | 435 | | | | | 440 | | | | | 445 | | | | |
| Ser | Gly | Thr | Asn | Ala | His | Ile | Ile | Leu | Glu | Ser | Ala | Gln | Glu | Tyr | Ala | |
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| Asp | Gly | Arg | Gln | Ala | Asp | Ala | Gly | Thr | Ala | Gly | Asn | Glu | Pro | Ala | Thr | |
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| Gly | Arg | Thr | Asn | Pro | Pro | Gly | Ala | Leu | Pro | Val | Val | Leu | Ser | Gly | Arg | |
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| Thr | Glu | Pro | Ala | Leu | Arg | Ala | Gln | Ala | Ala | Ala | Leu | His | Ala | His | Leu | |
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| Ala | Ala | His | Pro | Gly | Leu | Gly | Ile | Ala | Asp | Leu | Ala | Phe | Ser | Gln | Ala | |
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| Leu | Thr | Arg | Ala | Ala | Leu | Asp | Arg | Arg | Ala | Ala | Val | Val | Ala | Asp | Asp | |
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| Arg | Asp | Ala | Leu | Leu | Ala | Gly | Leu | Ala | Ala | Leu | Ala | Glu | Gly | Arg | Pro | |
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| Ser | Ala | Asp | Val | Val | Glu | Gly | Ser | Ala | Thr | Asp | Gly | Lys | Leu | Ala | Phe | |
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| Leu | Phe | Thr | Gly | Gln | Gly | Ser | Gln | Arg | Pro | Gly | Met | Gly | Arg | Glu | Leu | |
| | | | 580 | | | | | 585 | | | | | 590 | | | |

Tyr Ala Thr Tyr Pro Val Phe Ala Gln Ala Leu Asp Ala Val Cys Glu
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 Arg Leu Glu Leu Pro Leu Lys Asp Val Leu Phe Gly Thr Asp Gly Ala
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 Ala Gly Ala Ala Leu Asp Glu Thr Ala Tyr Thr Gln Pro Ala Leu Phe
 625 630 635 640
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 Pro Asp Tyr Leu Ala Gly His Ser Ile Gly Glu Ile Ala Ala Ala His
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 Val Ala Gly Val Phe Ser Leu Glu Asp Ala Cys Thr Leu Val Glu Ala
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 Arg Gly Arg Leu Met Gln Ala Leu Pro Thr Gly Gly Val Met Ile Ala
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 Asp Gly Met Leu Asp Ala Phe Arg Thr Val Ala Gln Gly Leu Ser Tyr
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 Gly Thr Pro Arg Ile Pro Val Val Ser Asn Leu Thr Gly Ala Leu Val
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 Ala Val Arg Phe Leu Asp Gly Ile Arg Trp Leu Glu Ser Arg Gly Val
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 Thr Thr Tyr Ile Glu Leu Gly Pro Gly Gly Val Leu Ser Ala Leu Gly
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 Gln Asp Cys Gln Thr Ala Thr Gly Pro Arg Ala Ala Ala Phe Leu Pro
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 Ala Leu Arg Thr Gly Arg Pro Glu Ala Ser Ser Leu Thr Ala Ala Val
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 Ala Gly Thr Gly Ala Gln Arg Val Glu Leu Pro Thr Tyr Ala Phe Gln
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Arg Glu Leu Tyr Trp Pro Arg Asp Pro Phe Thr Asp Pro Ala Glu Ser
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 Ala His Gly Gly Glu Leu Gly Ala Thr Asp Ala Lys Phe Trp Glu Val
 930 935 940
 Val Asp Ser Glu Asp Leu Ala Ala Leu Ala Asp Thr Leu Gly Val Gly
 945 950 955 960
 Gly Asp Glu Pro Leu Ser Ser Val Leu Pro Ala Leu Ser Ala Trp His
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 Arg Arg His Arg Asp Arg Asp Thr Val Asp Gly Trp Arg Tyr Arg Val
 980 985 990
 Thr Trp Lys Pro Leu Thr Asp Thr Thr Pro Ala Ser Pro Ser Gly His
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 1010 1015 1020
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 Thr Val Val Leu Asp Ala Thr Leu Asp Asp Arg Ala Ala Thr Ala
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 Ala Pro Ala Gly Ala Glu Thr Leu Ala Gly Val Phe Ser Leu Leu
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 Gly Val Glu Ala Pro Leu Trp Ala Ala Thr Cys Gly Ala Val Ser
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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
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| Arg | His | Val | Ala | Arg | Trp | Leu | Ala | Arg | Thr | Gly | Ala | Gln | His | Leu |
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| Leu | Leu | Val | Ser | Arg | Arg | Gly | Pro | Glu | Ala | Glu | Gly | Ala | Asp | Ala |
| 1250 | | | | | | 1255 | | | | | 1260 | | | |
| Leu | Ala | Ala | Glu | Leu | Arg | Ala | Leu | Gly | Ala | Glu | Val | Thr | Ile | Ala |
| 1265 | | | | | | 1270 | | | | | 1275 | | | |
| Ala | Cys | Asp | Val | Ala | Asp | Arg | Asp | Ala | Val | Ala | Ala | Leu | Leu | Ala |
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| Thr | Leu | Pro | Ala | Glu | His | Pro | Leu | Thr | Asn | Val | Val | His | Ala | Ala |
| 1295 | | | | | | 1300 | | | | | 1305 | | | |
| Gly | Val | Leu | Asp | Asp | Gly | Val | Leu | Asp | Ala | Gln | Thr | Pro | Gln | Arg |
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| Leu | Ala | Gly | Val | Leu | Arg | Pro | Lys | Ala | His | Ala | Ala | Gln | Val | Leu |
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| His | Glu | Leu | Thr | Arg | Asp | Leu | Asp | Leu | Ser | Ala | Phe | Val | Leu | Phe |
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| Ser | Ser | Val | Ala | Ala | Val | Phe | Gly | Ala | Ala | Gly | Gln | Ala | Asn | Tyr |
| 1355 | | | | | | 1360 | | | | | 1365 | | | |
| Ala | Ala | Ala | Asn | Ala | Ser | Leu | Glu | Ala | Leu | Ala | Glu | Gln | Arg | Arg |
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| Ala | Asp | Gly | Leu | Pro | Ala | Thr | Val | Leu | Ala | Trp | Gly | Ala | Trp | Ala |
| 1385 | | | | | | 1390 | | | | | 1395 | | | |
| Glu | Gly | Gly | Met | Ala | Thr | Asp | Glu | Leu | Val | Ala | Glu | Arg | Leu | Arg |
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| Leu | Ala | Gly | Leu | Pro | Ala | Leu | Ala | Pro | Glu | Leu | Ala | Leu | Ser | Ala |
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| Leu | His | Arg | Ala | Leu | Thr | Leu | Asp | Glu | Thr | Ala | Ser | Leu | Val | Ala |
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| Asp | Ile | Asp | Trp | Glu | Arg | Leu | Ala | Pro | Gly | Leu | Thr | Ala | Val | Arg |
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| Pro | Cys | Pro | Leu | Ile | Ala | Asp | Leu | Pro | Glu | Ala | Val | His | Ala | Leu |
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| Ala | Gly | Ala | Glu | Ala | Ser | Thr | Gly | Pro | Gly | Ala | Ala | Ala | Asp | Thr |
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| Phe | Ala | Arg | Gln | Leu | Ala | Asp | Ala | Pro | Ala | Gly | Glu | Arg | Asp | Gln |
| 1490 | | | | | | 1495 | | | | | 1500 | | | |
| Leu | Ala | Leu | Glu | Phe | Val | Arg | Thr | Gln | Val | Ala | Ala | Val | Leu | Gly |
| 1505 | | | | | | 1510 | | | | | 1515 | | | |

| | | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|--|
| Tyr | Ala | Gly | Pro | Glu | Ser | Val | Asp | Pro | Gly | Ser | Ala | Phe | Arg | Asp | |
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| Leu | Gly | Phe | Asp | Ser | Leu | Thr | Ala | Val | Glu | Ile | Arg | Asn | Leu | Leu | |
| 1535 | | | | | | 1540 | | | | | 1545 | | | | |
| Thr | Ser | Arg | Thr | Gly | Leu | Arg | Leu | Pro | Ala | Thr | Leu | Ile | Phe | Asp | |
| 1550 | | | | | | 1555 | | | | | 1560 | | | | |
| Tyr | Pro | Asn | Ser | Leu | Ser | Leu | Ala | Ala | Phe | Leu | Gln | Gly | Glu | Leu | |
| 1565 | | | | | | 1570 | | | | | 1575 | | | | |
| Leu | Gly | Ala | Gln | Ala | Thr | Asp | Pro | Ala | Arg | His | Thr | Pro | Ala | Gly | |
| 1580 | | | | | | 1585 | | | | | 1590 | | | | |
| Pro | Gly | Thr | Ala | Thr | Asp | Asp | Asp | Pro | Ile | Ala | Ile | Val | Ala | Met | |
| 1595 | | | | | | 1600 | | | | | 1605 | | | | |
| Ser | Cys | Arg | Phe | Pro | Gly | Gly | Val | Gln | Ser | Pro | Glu | Asp | Leu | Trp | |
| 1610 | | | | | | 1615 | | | | | 1620 | | | | |
| Gln | Leu | Leu | Ser | Thr | Gly | Arg | Asp | Ala | Ile | Ser | Gly | Phe | Pro | Gly | |
| 1625 | | | | | | 1630 | | | | | 1635 | | | | |
| Asp | Arg | Gly | Trp | Asp | Leu | Asp | Gly | Leu | Tyr | Asp | Pro | Glu | Ser | Ala | |
| 1640 | | | | | | 1645 | | | | | 1650 | | | | |
| Gly | Glu | Asn | Thr | Ser | Tyr | Val | Arg | Glu | Gly | Gly | Phe | Leu | Ala | Gly | |
| 1655 | | | | | | 1660 | | | | | 1665 | | | | |
| Ala | Thr | Glu | Phe | Asp | Pro | Ala | Phe | Phe | Gly | Ile | Ser | Pro | Arg | Glu | |
| 1670 | | | | | | 1675 | | | | | 1680 | | | | |
| Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | Leu | Leu | Glu | Thr | Ser | |
| 1685 | | | | | | 1690 | | | | | 1695 | | | | |
| Trp | Glu | Ala | Phe | Glu | Arg | Ala | Gly | Ile | Asp | Pro | Ala | Thr | Val | Arg | |
| 1700 | | | | | | 1705 | | | | | 1710 | | | | |
| Gly | Glu | Gln | Ile | Gly | Val | Phe | Thr | Gly | Thr | Asn | Gly | Gln | Asp | Tyr | |
| 1715 | | | | | | 1720 | | | | | 1725 | | | | |
| Leu | Asn | Val | Ile | Leu | Ala | Ala | Pro | Asp | Gly | Val | Glu | Gly | Phe | Leu | |
| 1730 | | | | | | 1735 | | | | | 1740 | | | | |
| Gly | Thr | Gly | Asn | Ala | Ala | Ser | Val | Val | Ser | Gly | Arg | Val | Ser | Tyr | |
| 1745 | | | | | | 1750 | | | | | 1755 | | | | |
| Val | Leu | Gly | Leu | Glu | Gly | Pro | Ala | Val | Thr | Val | Asp | Thr | Ala | Cys | |
| 1760 | | | | | | 1765 | | | | | 1770 | | | | |
| Ser | Ser | Ser | Leu | Val | Ala | Leu | His | Trp | Ala | Ile | Gln | Ala | Leu | Arg | |
| 1775 | | | | | | 1780 | | | | | 1785 | | | | |
| Gln | Gly | Glu | Cys | Thr | Met | Ala | Leu | Ala | Gly | Gly | Val | Thr | Val | Met | |
| 1790 | | | | | | 1795 | | | | | 1800 | | | | |
| Ser | Thr | Pro | Ala | Ser | Phe | Ile | Asp | Phe | Ser | Arg | Gln | Arg | Gly | Leu | |
| 1805 | | | | | | 1810 | | | | | 1815 | | | | |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|------|-----|-----|
| Ala | Glu | Asp | Gly | Arg | Ile | Lys | Ala | Phe | Ala | Ala | Ala | Ala | Asp | Gly |
| 1820 | | | | | | 1825 | | | | | | 1830 | | |
| Thr | Gly | Trp | Gly | Glu | Gly | Val | Gly | Ile | Leu | Leu | Val | Glu | Arg | Leu |
| 1835 | | | | | | 1840 | | | | | 1845 | | | |
| Ser | Asp | Ala | Gln | Arg | Asn | Gly | His | Pro | Val | Leu | Ala | Ile | Val | Arg |
| 1850 | | | | | | 1855 | | | | | 1860 | | | |
| Gly | Ser | Ala | Ile | Asn | Gln | Asp | Gly | Ala | Ser | Asn | Gly | Leu | Thr | Ala |
| 1865 | | | | | | 1870 | | | | | 1875 | | | |
| Pro | Asn | Gly | Pro | Ser | Gln | Gln | Arg | Val | Ile | Arg | Gln | Ala | Leu | Ala |
| 1880 | | | | | | 1885 | | | | | 1890 | | | |
| Ser | Gly | Gly | Leu | Thr | Thr | Met | Asp | Val | Asp | Ala | Val | Glu | Ala | His |
| 1895 | | | | | | 1900 | | | | | 1905 | | | |
| Gly | Thr | Gly | Thr | Lys | Leu | Gly | Asp | Pro | Ile | Glu | Ala | Gln | Ala | Leu |
| 1910 | | | | | | 1915 | | | | | 1920 | | | |
| Leu | Ala | Thr | Tyr | Gly | Gln | Asp | Arg | Pro | Glu | Gly | Arg | Pro | Leu | Leu |
| 1925 | | | | | | 1930 | | | | | 1935 | | | |
| Leu | Gly | Ser | Ile | Lys | Ser | Asn | Leu | Gly | His | Thr | Gln | Ala | Ala | Ala |
| 1940 | | | | | | 1945 | | | | | 1950 | | | |
| Gly | Val | Ala | Gly | Val | Met | Lys | Met | Val | Leu | Ala | Met | Gln | His | Gly |
| 1955 | | | | | | 1960 | | | | | 1965 | | | |
| Val | Leu | Pro | Gln | Thr | Leu | His | Val | Asp | Glu | Pro | Thr | Pro | His | Val |
| 1970 | | | | | | 1975 | | | | | 1980 | | | |
| Asp | Trp | Ser | Ala | Gly | Asp | Val | Ala | Leu | Leu | Ala | Asp | Ala | Val | Ala |
| 1985 | | | | | | 1990 | | | | | 1995 | | | |
| Trp | Pro | Glu | Thr | Gly | Arg | Pro | Arg | Arg | Ala | Gly | Val | Ser | Ser | Phe |
| 2000 | | | | | | 2005 | | | | | 2010 | | | |
| Gly | Ile | Ser | Gly | Thr | Asn | Ala | His | Thr | Ile | Ile | Glu | Gln | Ala | Pro |
| 2015 | | | | | | 2020 | | | | | 2025 | | | |
| Ala | Ala | Val | Ala | Pro | Val | Pro | Pro | Val | Ala | Thr | Thr | Pro | Ala | Arg |
| 2030 | | | | | | 2035 | | | | | 2040 | | | |
| Ala | Asp | Gly | Pro | Gln | Pro | Trp | Leu | Leu | Ser | Ala | Lys | Thr | Arg | Asp |
| 2045 | | | | | | 2050 | | | | | 2055 | | | |
| Ala | Leu | His | Asp | Gln | Ala | Arg | Arg | Leu | His | Ala | His | Ala | Glu | Leu |
| 2060 | | | | | | 2065 | | | | | 2070 | | | |
| Asn | Pro | Glu | Leu | Ser | Pro | Ala | Asp | Leu | Gly | Leu | Ser | Leu | Ala | Ala |
| 2075 | | | | | | 2080 | | | | | 2085 | | | |
| Gly | Arg | Ser | Ala | Phe | Glu | Arg | Arg | Ala | Ala | Val | Ile | Ala | Ala | Asp |
| 2090 | | | | | | 2095 | | | | | 2100 | | | |
| Arg | Asp | Gly | Leu | Leu | Ala | Gly | Leu | Ala | Ala | Leu | Ala | Asp | Gly | Gly |
| 2105 | | | | | | 2110 | | | | | 2115 | | | |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Ala | Ala | Ala | Gly | Leu | Val | Glu | Gly | Ser | Pro | Val | Ala | Gly | Lys | Leu |
| 2120 | | | | | | 2125 | | | | | 2130 | | | |
| Ala | Phe | Leu | Phe | Thr | Gly | Gln | Gly | Ser | Gln | Arg | Leu | Gly | Met | Gly |
| 2135 | | | | | | 2140 | | | | | 2145 | | | |
| Arg | Glu | Leu | Tyr | Asp | Thr | Tyr | Pro | Val | Phe | Ala | Asp | Ala | Leu | Asp |
| 2150 | | | | | | 2155 | | | | | 2160 | | | |
| Ala | Val | Cys | Ala | His | Val | Asp | Ala | His | Leu | Glu | Val | Pro | Leu | Lys |
| 2165 | | | | | | 2170 | | | | | 2175 | | | |
| Asp | Val | Leu | Phe | Gly | Ala | Asp | Thr | Gly | Leu | Leu | Asp | Gln | Thr | Ala |
| 2180 | | | | | | 2185 | | | | | 2190 | | | |
| Tyr | Thr | Gln | Pro | Ala | Leu | Phe | Ala | Val | Glu | Val | Ala | Leu | Phe | Arg |
| 2195 | | | | | | 2200 | | | | | 2205 | | | |
| Leu | Val | Glu | Ser | Trp | Gly | Leu | Arg | Pro | Asp | Phe | Leu | Ala | Gly | His |
| 2210 | | | | | | 2215 | | | | | 2220 | | | |
| Ser | Ile | Gly | Glu | Ile | Ala | Ala | Ala | His | Val | Ala | Gly | Val | Phe | Ser |
| 2225 | | | | | | 2230 | | | | | 2235 | | | |
| Leu | Gln | Asp | Ala | Ser | Glu | Leu | Val | Val | Ala | Arg | Gly | Arg | Leu | Met |
| 2240 | | | | | | 2245 | | | | | 2250 | | | |
| Gln | Ala | Leu | Pro | Thr | Gly | Gly | Val | Met | Ile | Ala | Val | Gln | Ala | Ser |
| 2255 | | | | | | 2260 | | | | | 2265 | | | |
| Glu | Asp | Glu | Val | Leu | Pro | Leu | Leu | Thr | Asp | Arg | Val | Ser | Ile | Ala |
| 2270 | | | | | | 2275 | | | | | 2280 | | | |
| Ala | Ile | Asn | Gly | Pro | Gln | Ser | Val | Val | Ile | Ala | Gly | Asp | Glu | Ala |
| 2285 | | | | | | 2290 | | | | | 2295 | | | |
| Asp | Ala | Val | Ala | Ile | Ala | Glu | Ser | Phe | Thr | Gly | Arg | Lys | Ser | Lys |
| 2300 | | | | | | 2305 | | | | | 2310 | | | |
| Arg | Leu | Thr | Val | Ser | His | Ala | Phe | His | Ser | Pro | His | Met | Asp | Gly |
| 2315 | | | | | | 2320 | | | | | 2325 | | | |
| Met | Leu | Glu | Asp | Phe | Arg | Ala | Val | Ala | Glu | Gly | Leu | Ser | Tyr | Glu |
| 2330 | | | | | | 2335 | | | | | 2340 | | | |
| Ala | Pro | Arg | Ile | Pro | Val | Val | Ser | Asn | Leu | Thr | Gly | Ala | Leu | Ile |
| 2345 | | | | | | 2350 | | | | | 2355 | | | |
| Ser | Asp | Glu | Met | Gly | Ser | Ala | Glu | Phe | Trp | Val | Arg | His | Val | Arg |
| 2360 | | | | | | 2365 | | | | | 2370 | | | |
| Glu | Ala | Val | Arg | Phe | Leu | Asp | Gly | Ile | Arg | Thr | Leu | Glu | Ala | Ala |
| 2375 | | | | | | 2380 | | | | | 2385 | | | |
| Gly | Val | Thr | Lys | Tyr | Val | Glu | Leu | Gly | Pro | Asp | Gly | Val | Leu | Ser |
| 2390 | | | | | | 2395 | | | | | 2400 | | | |
| Ala | Met | Ala | Gln | Asp | Cys | Val | Ser | Gly | Glu | Gly | Ser | Val | Phe | Ile |
| 2405 | | | | | | 2410 | | | | | 2415 | | | |

| | | | | | | | | | |
|---------|---------|---------|------|---------|---------|------|---------|-----|--|
| Pro Val | Leu Arg | Lys Ala | Arg | Pro Glu | Pro Glu | Ser | Val Thr | Thr | |
| 2420 | | | 2425 | | | 2430 | | | |
| Ala Leu | Thr Thr | Ala His | Val | His Gly | Ile Pro | Val | Asp Trp | Gln | |
| 2435 | | | 2440 | | | 2445 | | | |
| Ala Phe | Phe Ala | Gly Thr | Gly | Ala Arg | Arg Val | Asp | Leu Pro | Thr | |
| 2450 | | | 2455 | | | 2460 | | | |
| Tyr Ala | Phe Gln | Arg Gln | Arg | Tyr Trp | Pro Ala | Val | Ser Ser | Leu | |
| 2465 | | | 2470 | | | 2475 | | | |
| Tyr Leu | Gly Asp | Val Glu | Ala | Ile Gly | Leu Asp | Asp | Thr Ala | His | |
| 2480 | | | 2485 | | | 2490 | | | |
| Pro Leu | Leu Ser | Ala Gly | Val | Ala Leu | Pro Glu | Ser | Asp Gly | Met | |
| 2495 | | | 2500 | | | 2505 | | | |
| Val Phe | Ala Gly | Arg Leu | Ala | Leu Ser | Thr His | Ala | Trp Leu | Ala | |
| 2510 | | | 2515 | | | 2520 | | | |
| Asp His | Ala Ile | Leu Gly | Ser | Val Leu | Leu Pro | Gly | Thr Ala | Phe | |
| 2525 | | | 2530 | | | 2535 | | | |
| Val Glu | Leu Ala | Thr Arg | Ala | Gly Asp | Gln Val | Gly | Cys Asp | Tyr | |
| 2540 | | | 2545 | | | 2550 | | | |
| Leu Glu | Glu Leu | Thr Leu | Glu | Ala Pro | Leu Val | Leu | Pro Glu | His | |
| 2555 | | | 2560 | | | 2565 | | | |
| Gly Gly | Val Gln | Leu Arg | Val | Trp Val | Gly Ala | Ala | Asp Glu | Ser | |
| 2570 | | | 2575 | | | 2580 | | | |
| Gly Arg | Arg Pro | Phe Ala | Leu | His Ser | Arg Ala | Glu | Gly Leu | Pro | |
| 2585 | | | 2590 | | | 2595 | | | |
| Val Glu | Glu Pro | Trp Thr | Arg | His Ala | Gly Gly | Val | Leu Ala | Glu | |
| 2600 | | | 2605 | | | 2610 | | | |
| Gly Gly | Arg Pro | Pro Ala | Asp | Phe Asp | Leu Thr | Ala | Trp Pro | Pro | |
| 2615 | | | 2620 | | | 2625 | | | |
| Pro Gly | Ala Val | Glu Val | Asp | Leu Asp | Gly Arg | Tyr | Asp Gln | Leu | |
| 2630 | | | 2635 | | | 2640 | | | |
| Asp Gly | Ile Gly | Phe Ala | Tyr | Gly Pro | Thr Phe | Arg | Gly Leu | Arg | |
| 2645 | | | 2650 | | | 2655 | | | |
| Thr Ala | Trp Gln | Leu Asp | Gly | Glu Ile | Tyr Ala | Glu | Val Arg | Leu | |
| 2660 | | | 2665 | | | 2670 | | | |
| Pro Glu | Gly Ala | Glu Gly | Glu | Ala Gly | Arg Phe | Gly | Leu His | Pro | |
| 2675 | | | 2680 | | | 2685 | | | |
| Ala Leu | Leu Asp | Ala Ala | Leu | His Ala | Ile Gly | Leu | Gly Gly | Leu | |
| 2690 | | | 2695 | | | 2700 | | | |
| Gly Ala | Asp Asp | Gly Gln | Gly | Arg Leu | Pro Phe | Ala | Trp Ser | Gly | |
| 2705 | | | 2710 | | | 2715 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Val | Ser | Leu | His | Ala | Gly | Gly | Ala | Ala | Ala | Leu | Arg | Val | His | Leu |
| 2720 | | | | | | 2725 | | | | | 2730 | | | |
| Ala | Pro | Ala | Gly | Ala | Glu | Gly | Val | Arg | Leu | Glu | Ile | Ala | Asp | Ala |
| 2735 | | | | | | 2740 | | | | | 2745 | | | |
| Ser | Gly | Ala | Pro | Val | Ala | Ala | Val | Glu | Ser | Leu | Gly | Leu | Arg | Pro |
| 2750 | | | | | | 2755 | | | | | 2760 | | | |
| Val | Thr | Ala | Glu | Gln | Leu | Arg | Ala | Ala | Arg | Ala | Thr | Tyr | His | Glu |
| 2765 | | | | | | 2770 | | | | | 2775 | | | |
| Ser | Val | Phe | Arg | Gln | Gln | Trp | Thr | Glu | Leu | Pro | Gly | Leu | Gly | Ala |
| 2780 | | | | | | 2785 | | | | | 2790 | | | |
| Pro | Ala | Ala | Thr | Pro | Ala | Val | Arg | Tyr | Ala | Phe | Leu | Gly | Gly | Asp |
| 2795 | | | | | | 2800 | | | | | 2805 | | | |
| Ser | Gly | Asp | Ser | Gly | Asp | Ser | Gly | Asp | Thr | Ala | Ala | Ala | Asp | Arg |
| 2810 | | | | | | 2815 | | | | | 2820 | | | |
| His | Gln | Asp | Leu | Ala | Ala | Leu | Ala | Ala | Ala | Ile | Asp | Ala | Gly | Arg |
| 2825 | | | | | | 2830 | | | | | 2835 | | | |
| Pro | Val | Pro | Asp | Glu | Val | Val | Val | Glu | Leu | Ala | Ala | Ala | Pro | Trp |
| 2840 | | | | | | 2845 | | | | | 2850 | | | |
| Ala | Val | Ser | Ala | Ser | Ala | Val | His | Ser | Ala | Ala | His | Asp | Ala | Leu |
| 2855 | | | | | | 2860 | | | | | 2865 | | | |
| Ala | Leu | Ile | Gln | Thr | Trp | Leu | Ala | Asp | Asp | Arg | Phe | Ala | Ala | Ala |
| 2870 | | | | | | 2875 | | | | | 2880 | | | |
| Arg | Leu | Val | Phe | Leu | Thr | Arg | Gly | Ala | Val | Ala | Ala | Asp | Ala | Gly |
| 2885 | | | | | | 2890 | | | | | 2895 | | | |
| Asp | Asp | Val | Thr | Asp | Leu | Ala | Ala | Ala | Thr | Val | Trp | Gly | Leu | Leu |
| 2900 | | | | | | 2905 | | | | | 2910 | | | |
| Arg | Ser | Ala | Gln | Thr | Glu | Asn | Pro | Gly | Arg | Ile | Ala | Leu | Val | Asp |
| 2915 | | | | | | 2920 | | | | | 2925 | | | |
| Thr | Asp | Gly | His | Asp | Arg | Ser | Glu | Gln | Ala | Leu | Arg | Ala | Ala | Leu |
| 2930 | | | | | | 2935 | | | | | 2940 | | | |
| Thr | Ser | Asp | Glu | Glu | Arg | Phe | Ala | Leu | Arg | Ala | Gly | Ala | Val | Leu |
| 2945 | | | | | | 2950 | | | | | 2955 | | | |
| Val | Pro | Arg | Leu | Ala | Arg | Val | Glu | Ile | Gln | Gln | Asp | Asp | Ser | Ala |
| 2960 | | | | | | 2965 | | | | | 2970 | | | |
| Arg | Thr | Pro | Ala | Leu | Thr | Pro | Gly | Gly | Thr | Val | Leu | Ile | Thr | Gly |
| 2975 | | | | | | 2980 | | | | | 2985 | | | |
| Ala | Thr | Gly | Ala | Leu | Gly | Gly | Leu | Phe | Ala | Arg | His | Leu | Ala | Ala |
| 2990 | | | | | | 2995 | | | | | 3000 | | | |
| Glu | His | Gly | Val | Glu | Arg | Leu | Leu | Leu | Val | Gly | Arg | Arg | Gly | Ala |
| 3005 | | | | | | 3010 | | | | | 3015 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Asp | Ala | Pro | Gly | Ala | Ala | Glu | Leu | Val | Ala | Glu | Leu | Ala | Glu | Ser |
| 3020 | | | | | | 3025 | | | | | 3030 | | | |
| Gly | Thr | Leu | Ala | Thr | Trp | Ala | Ala | Cys | Asp | Val | Ala | Asp | Arg | Asp |
| 3035 | | | | | | 3040 | | | | | 3045 | | | |
| Ala | Leu | Ala | Ala | Leu | Leu | Ala | Asp | Ile | Pro | Ala | Glu | His | Pro | Leu |
| 3050 | | | | | | 3055 | | | | | 3060 | | | |
| Thr | Ala | Val | Val | His | Thr | Ala | Gly | Val | Leu | Asp | Asp | Gly | Val | Ile |
| 3065 | | | | | | 3070 | | | | | 3075 | | | |
| Ser | Ser | Leu | Thr | Pro | Glu | Arg | Leu | Ser | Ala | Val | Leu | Arg | Pro | Lys |
| 3080 | | | | | | 3085 | | | | | 3090 | | | |
| Val | Asp | Ala | Ala | Trp | Asn | Leu | His | Glu | Leu | Thr | Arg | Gly | Leu | Asp |
| 3095 | | | | | | 3100 | | | | | 3105 | | | |
| Leu | Ala | Ala | Phe | Val | Leu | Phe | Ser | Ser | Thr | Ser | Gly | Leu | Phe | Gly |
| 3110 | | | | | | 3115 | | | | | 3120 | | | |
| Gly | Pro | Gly | Gln | Gly | Asn | Tyr | Ala | Ala | Ala | Asn | Ser | Phe | Leu | Asp |
| 3125 | | | | | | 3130 | | | | | 3135 | | | |
| Ala | Leu | Ala | Gln | His | Arg | Arg | Ala | His | Gly | Leu | Pro | Ala | Thr | Ser |
| 3140 | | | | | | 3145 | | | | | 3150 | | | |
| Thr | Ala | Trp | Gly | Leu | Trp | Ser | Val | Ala | Asp | Gly | Met | Ala | Gly | Ala |
| 3155 | | | | | | 3160 | | | | | 3165 | | | |
| Leu | Asp | Ala | Ala | Asp | Val | Asn | Arg | Met | Arg | Arg | Ala | Gly | Leu | Pro |
| 3170 | | | | | | 3175 | | | | | 3180 | | | |
| Pro | Leu | Thr | Ala | Ala | Asp | Gly | Leu | Gly | Leu | Phe | Asp | Thr | Ala | Val |
| 3185 | | | | | | 3190 | | | | | 3195 | | | |
| Ser | Leu | Asp | Glu | Ala | Ser | Leu | Ala | Leu | Met | Arg | Val | Asp | Thr | Glu |
| 3200 | | | | | | 3205 | | | | | 3210 | | | |
| Val | Leu | Arg | Thr | Gln | Ala | Gly | Ala | Gly | Thr | Ile | Ala | Pro | Leu | Leu |
| 3215 | | | | | | 3220 | | | | | 3225 | | | |
| Arg | Gly | Leu | Val | Arg | Gly | Val | Ala | Arg | Arg | Ser | Val | Asp | Val | Ser |
| 3230 | | | | | | 3235 | | | | | 3240 | | | |
| Ala | Gly | Ala | Gly | Gly | Ala | Glu | Ser | Glu | Leu | Arg | Gly | Arg | Leu | Ala |
| 3245 | | | | | | 3250 | | | | | 3255 | | | |
| Ala | Leu | Thr | Ala | Ala | Glu | Gln | Asp | Arg | Ala | Leu | Leu | Asp | Leu | Val |
| 3260 | | | | | | 3265 | | | | | 3270 | | | |
| Arg | Thr | Gln | Val | Ala | Ala | Val | Leu | Gly | His | Ala | Gly | Pro | Ala | Ala |
| 3275 | | | | | | 3280 | | | | | 3285 | | | |
| Val | Glu | Ser | Gly | Arg | Ala | Phe | Lys | Glu | Leu | Gly | Phe | Asp | Ser | Leu |
| 3290 | | | | | | 3295 | | | | | 3300 | | | |
| Thr | Ala | Val | Glu | Leu | Arg | Asn | Arg | Leu | Asn | Ala | Ala | Thr | Ala | Leu |
| 3305 | | | | | | 3310 | | | | | 3315 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Arg | Leu | Pro | Ala | Thr | Leu | Ile | Phe | Asp | Tyr | Pro | Asp | Pro | Thr | Val |
| 3320 | | | | | | 3325 | | | | | 3330 | | | |
| Leu | Ala | Arg | Tyr | Leu | Arg | Gly | Glu | Leu | Ile | Gly | Asp | Asp | Thr | Thr |
| 3335 | | | | | | 3340 | | | | | 3345 | | | |
| Asp | Ala | Val | Ala | Glu | Pro | Leu | Thr | Ala | Val | Ala | Asp | Asp | Glu | Pro |
| 3350 | | | | | | 3355 | | | | | 3360 | | | |
| Ile | Ala | Ile | Val | Ala | Met | Ser | Cys | Arg | Tyr | Pro | Gly | Asp | Val | Arg |
| 3365 | | | | | | 3370 | | | | | 3375 | | | |
| Thr | Pro | Glu | Asp | Leu | Trp | Gln | Leu | Leu | Thr | Ala | Gly | Ala | Asp | Gly |
| 3380 | | | | | | 3385 | | | | | 3390 | | | |
| Ile | Thr | Arg | Leu | Pro | Glu | Asn | Arg | Gly | Trp | Asp | Thr | Glu | Gly | Leu |
| 3395 | | | | | | 3400 | | | | | 3405 | | | |
| Tyr | Asp | Pro | Asp | Pro | Glu | Ser | Gln | Gly | Thr | Ser | Tyr | Ala | Arg | Asp |
| 3410 | | | | | | 3415 | | | | | 3420 | | | |
| Gly | Gly | Phe | Leu | His | Asp | Ala | Ala | Glu | Phe | Asp | Ala | Ser | Phe | Phe |
| 3425 | | | | | | 3430 | | | | | 3435 | | | |
| Gly | Ile | Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg |
| 3440 | | | | | | 3445 | | | | | 3450 | | | |
| Leu | Leu | Leu | Glu | Thr | Thr | Trp | Glu | Val | Phe | Glu | Arg | Ala | Gly | Ile |
| 3455 | | | | | | 3460 | | | | | 3465 | | | |
| Ala | Pro | Ser | Ala | Val | Arg | Gly | Ser | Arg | Thr | Gly | Val | Phe | Ala | Gly |
| 3470 | | | | | | 3475 | | | | | 3480 | | | |
| Val | Met | Tyr | His | Asp | Tyr | Gly | Ala | Arg | Leu | His | Ala | Val | Pro | Asp |
| 3485 | | | | | | 3490 | | | | | 3495 | | | |
| Gly | Val | Glu | Gly | Tyr | Leu | Gly | Thr | Gly | Ser | Ser | Ser | Ser | Ile | Val |
| 3500 | | | | | | 3505 | | | | | 3510 | | | |
| Ser | Gly | Arg | Val | Ala | Tyr | Thr | Phe | Gly | Leu | Glu | Gly | Pro | Ala | Val |
| 3515 | | | | | | 3520 | | | | | 3525 | | | |
| Thr | Val | Asp | Thr | Ala | Cys | Ser | Ser | Ser | Leu | Val | Ala | Leu | His | Leu |
| 3530 | | | | | | 3535 | | | | | 3540 | | | |
| Ala | Ala | Gln | Ala | Leu | Arg | Asn | Gly | Glu | Cys | Ser | Leu | Ala | Leu | Ala |
| 3545 | | | | | | 3550 | | | | | 3555 | | | |
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| | | | | | | | | | | | | | | |
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| Leu | Leu | Thr | Asp | Arg | Val | Ser | Ile | Ala | Ala | Ile | Asn | Gly | Pro | Gln |
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| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
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| Ser | Thr | Val | Gly | Pro | Asp | Asp | Val | Glu | Arg | Ala | Gly | Ile | Thr | Ala |
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 <213> Streptomyces aizunensis

<400> 31

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| Met | Val | Asn | Glu | Glu | Lys | Tyr | Leu | Asp | Tyr | Leu | Lys | Arg | Ala | Thr | Thr | | | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | | | |
| Asp | Leu | Arg | Glu | Ala | Arg | Arg | Arg | Leu | Arg | Glu | Val | Glu | Glu | Arg | Glu | | | |
| | | | 20 | | | | | 25 | | | | | 30 | | | | | |
| Gln | Glu | Pro | Ile | Ala | Val | Val | Ala | Met | Ser | Cys | Arg | Tyr | Pro | Gly | Gly | | | |
| | | 35 | | | | | 40 | | | | | 45 | | | | | | |
| Ile | Asp | Thr | Pro | Glu | Lys | Leu | Trp | Asp | Leu | Val | Ala | His | Gly | Arg | Asp | | | |
| | 50 | | | | | 55 | | | | | 60 | | | | | | | |
| Ala | Val | Ser | Ala | Tyr | Pro | Thr | Asp | Arg | Gly | Trp | Asp | Ala | Glu | Val | Leu | | | |
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| Phe | Asp | Pro | Asp | Pro | Glu | Thr | Gly | Ile | Glu | Ala | Tyr | Glu | Gln | Val | Gly | | | |
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| Gly | Phe | Leu | His | Asp | Ala | Ala | Asp | Phe | Asp | Pro | Ala | Phe | Phe | Gly | Ile | | | |
| | | 100 | | | | | | 105 | | | | | 110 | | | | | |
| Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | Leu | Leu | | | |
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| Glu | Thr | Ser | Trp | Glu | Ala | Phe | Glu | Arg | Ala | Gly | Ile | Asp | Pro | Ala | Thr | | | |
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| Leu | Arg | Gly | Ser | Arg | Thr | Gly | Val | Phe | Ala | Gly | Leu | Met | Tyr | His | Asp | | | |
| 145 | | | | | 150 | | | | | 155 | | | | 160 | | | | |
| Tyr | Ala | Ala | Arg | Leu | Phe | Ser | Val | Pro | Glu | Glu | Ile | Glu | Gly | Phe | Leu | | | |
| | | | 165 | | | | | | 170 | | | | | 175 | | | | |
| Gly | Asn | Gly | Ser | Ser | Gly | Ser | Ile | Ala | Ser | Gly | Arg | Ile | Ala | Tyr | Thr | | | |
| | | 180 | | | | | | 185 | | | | | 190 | | | | | |
| Leu | Gly | Leu | Glu | Gly | Pro | Ala | Val | Thr | Val | Asp | Thr | Ala | Cys | Ser | Ser | | | |
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| Ser | Leu | Val | Ala | Val | His | Leu | Ala | Ala | Gln | Ala | Leu | Arg | Asn | Gly | Glu | | | |
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| Cys | Thr | Leu | Ala | Leu | Ala | Gly | Gly | Val | Thr | Val | Met | Ser | Thr | Pro | Gly | | | |
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| | | | | | | | | | | | | | | | | |
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| Thr | Phe | Thr | Glu | Phe | Ser | Arg | Gln | Arg | Gly | Leu | Ala | Ala | Asp | Gly | Arg | |
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| | | | 260 | | | | | 265 | | | | | 270 | | | |
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| Pro | Leu | Trp | Leu | Gly | Ser | Ile | Lys | Ser | Asn | Met | Gly | His | Thr | Gln | Ala | |
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| Ala | Ala | Gly | Ile | Ala | Gly | Ile | Ile | Lys | Met | Val | Met | Ala | Met | Arg | His | |
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| Gly | Ile | Leu | Pro | Lys | Thr | Leu | His | Val | Asp | Glu | Pro | Thr | Pro | Asn | Val | |
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| Asp | Trp | Ser | Glu | Gly | Ala | Val | Ser | Leu | Leu | Thr | Glu | Ser | Val | Pro | Trp | |
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| Pro | Glu | Thr | Gly | Ala | Pro | Arg | Arg | Ala | Gly | Val | Ser | Ser | Phe | Gly | Ile | |
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| Ser | Gly | Thr | Asn | Ala | His | Thr | Ile | Leu | Glu | Gln | Ala | Pro | Asp | Ala | Val | |
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| Glu | Ala | Ala | Pro | Gly | Thr | Glu | Pro | Pro | Ala | Ala | Ala | Ala | Pro | Pro | Val | |
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| Pro | Pro | Leu | Trp | Thr | Leu | Ser | Ala | Lys | Ser | Pro | Ala | Ala | Leu | Arg | Ala | |
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| Gln | Ala | Gly | Lys | Leu | His | Ala | His | Leu | Thr | Ala | His | Pro | Gly | Leu | Arg | |
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| His | Arg | Ala | Val | Leu | Thr | Ser | Ala | Asp | Gly | Pro | Val | Gly | Leu | Val | Arg | |
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| Asp | Arg | Ala | Pro | Gly | Val | Thr | Arg | Gly | Arg | Pro | Val | Ala | Gly | Lys | Leu | |
| | | | | 565 | | | | | 570 | | | | | 575 | | |
| Ala | Phe | Leu | Phe | Thr | Gly | Gln | Gly | Ser | Gln | Arg | Leu | Gly | Met | Gly | Arg | |
| | | | 580 | | | | | 585 | | | | | 590 | | | |
| Glu | Leu | Tyr | Glu | Thr | Tyr | Pro | Val | Phe | Ala | Gln | Ala | Leu | Asp | Ala | Val | |
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| Cys | Glu | Arg | Leu | Asn | Leu | Glu | Val | Pro | Leu | Arg | Asp | Val | Leu | Phe | Gly | |
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| Ala | Arg | Gly | Arg | Leu | Met | Gly | Ala | Leu | Pro | Gly | Gly | Gly | Val | Met | Ile | |
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| Ala | Val | Gln | Ala | Ser | Glu | Asp | Glu | Val | Leu | Pro | Leu | Leu | Thr | Asp | Arg | |
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| Val | Ser | Ile | Ala | Ala | Ile | Asn | Gly | Pro | Gln | Ser | Val | Val | Ile | Ala | Gly | |
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| Asp | Glu | Ala | Asp | Ala | Val | Ala | Ile | Ala | Glu | Ser | Phe | Ala | Asp | Arg | Lys | |
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| His | Phe | Val | Glu | Leu | Gly | Pro | Asp | Ala | Val | Leu | Ser | Ala | Met | Ala | Gln | |
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Val Gly Gly Val Ala Val Asp Trp Asp Ala Tyr Tyr Ser Gly Thr Asp
885 890 895
Val Gln Arg Val Asp Leu Pro Thr Tyr Ala Phe Gln Arg Ala His Tyr
900 905 910
Trp Leu Asp Ala Gly Arg Pro Leu Gly Asp Val Ser Ser Ala Gly Leu
915 920 925
Gly Ala Ala Gly His Pro Leu Leu Gly Ala Ala Val Ala Leu Ala Asp
930 935 940
Leu Asp Gly Phe Leu Tyr Thr Gly Arg Leu Ser Leu Asp Thr His Pro
945 950 955 960
Trp Leu Ala Asp His Ala Val Met Gly Ser Ala Val Leu Pro Gly Thr
965 970 975
Ala Phe Val Glu Leu Ala Ile Arg Ala Gly Asp Gln Val Gly Cys Asp
980 985 990
Leu Leu Glu Glu Leu Thr Leu His Ala Pro Leu Val Leu Pro Pro Ala
995 1000 1005
Gly Gly Val Gln Val Gln Leu Trp Val Gly Ala Pro Asp Ala Thr
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Gly Arg Arg Thr Leu Gly Val His Ser Arg Pro Glu Pro Ala Pro
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Asp Ala Val Gly Pro Asp Ala Asp Ala Ala Glu Pro Trp Thr Arg
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His Ala Asp Gly Val Leu Ala Thr Gly Ala Pro Gln Pro Ser Phe
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Asp Glu Leu Tyr Ala Gly Leu Ala Glu Ala Gly Leu Glu Tyr Gly
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Pro Ala Phe Gln Gly Val Arg Ala Ala Trp Ala Ser Asp Asp Ala
1100 1105 1110
Ala Tyr Val Glu Ile Ala Ala Ala Asp Gly Gln Trp Ala Asp Ala
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Pro Leu Phe Gly Leu His Pro Ala Leu Leu Asp Ser Ala Leu His
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Ser Val Leu Arg Val Arg Leu Ala Lys Ala Gly Pro Asp Ala Val
1175 1180 1185

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
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| 1190 | | | | | | 1195 | | | | | 1200 | | | |
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| Gly | Arg | Gly | Gly | His | His | Asp | Ala | Leu | Phe | Gln | Val | Asp | Trp | Thr |
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| His | Ala | Asp | Ala | Glu | Ala | Leu | Ser | Ala | Ala | Leu | Asp | Ala | Gly | Ala |
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| Pro | Thr | Pro | Glu | Ala | Val | His | Gln | Ala | Ala | His | Arg | Thr | Leu | Gly |
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| Leu | Leu | Arg | His | Trp | Leu | Gly | Asp | Asp | Arg | Leu | Ala | Asp | Ser | Arg |
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| Leu | Ala | Ser | Glu | Glu | Pro | Gln | Val | Ala | Leu | Arg | Gly | Gly | Val | Ala |
| 1385 | | | | | | 1390 | | | | | 1395 | | | |
| His | Ala | Pro | Arg | Leu | Ala | Lys | Val | Pro | Ala | Thr | Ala | Thr | Ala | Ala |
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| Val | Thr | Gly | Ala | Ser | Gly | Thr | Leu | Gly | Gly | Leu | Val | Ala | Arg | His |
| 1430 | | | | | | 1435 | | | | | 1440 | | | |
| Leu | Val | Thr | Gly | Arg | Gly | Val | Arg | Arg | Leu | Leu | Leu | Leu | Ser | Arg |
| 1445 | | | | | | 1450 | | | | | 1455 | | | |
| Arg | Gly | Ala | Asp | Ala | Pro | Gly | Ala | Gly | Glu | Leu | Ala | Ala | Glu | Leu |
| 1460 | | | | | | 1465 | | | | | 1470 | | | |
| Thr | Gly | Leu | Gly | Ala | Glu | Val | Ser | Trp | Ala | Ala | Cys | Asp | Ala | Gly |
| 1475 | | | | | | 1480 | | | | | 1485 | | | |

| | | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|--|
| Asp | Arg | Asp | Ala | Leu | Ala | Ala | Val | Leu | Ala | Ala | Val | Pro | Ala | Ala | |
| 1490 | | | | | | 1495 | | | | | 1500 | | | | |
| His | Pro | Leu | Thr | Ala | Val | Val | His | Thr | Ala | Gly | Val | Leu | Asp | Asp | |
| 1505 | | | | | | 1510 | | | | | 1515 | | | | |
| Gly | Val | Ile | Gly | Ser | Leu | Thr | Pro | Glu | Arg | Leu | Asp | Thr | Val | Leu | |
| 1520 | | | | | | 1525 | | | | | 1530 | | | | |
| Arg | Pro | Lys | Ala | Asp | Ala | Ala | Leu | His | Leu | His | Glu | Leu | Thr | Arg | |
| 1535 | | | | | | 1540 | | | | | 1545 | | | | |
| Asp | Leu | Pro | Leu | Thr | Ala | Phe | Val | Leu | Phe | Ser | Ser | Ala | Ala | Gly | |
| 1550 | | | | | | 1555 | | | | | 1560 | | | | |
| Val | Phe | Gly | Ala | Pro | Gly | Gln | Gly | Asn | Tyr | Ala | Ala | Ala | Asn | Ser | |
| 1565 | | | | | | 1570 | | | | | 1575 | | | | |
| Phe | Leu | Asp | Ala | Leu | Ala | Gln | Tyr | Arg | Arg | Ala | His | Gly | Leu | Pro | |
| 1580 | | | | | | 1585 | | | | | 1590 | | | | |
| Gly | Arg | Ser | Leu | Ala | Trp | Gly | Leu | Trp | Glu | Asp | Ala | Glu | Gly | Met | |
| 1595 | | | | | | 1600 | | | | | 1605 | | | | |
| Ala | Gly | Ala | Leu | Asp | Arg | Ala | Asp | Leu | Asp | Arg | Met | Lys | Arg | Gly | |
| 1610 | | | | | | 1615 | | | | | 1620 | | | | |
| Gly | Val | His | Gly | Leu | Thr | Ala | Ser | Glu | Gly | Leu | Ala | Leu | Leu | Asp | |
| 1625 | | | | | | 1630 | | | | | 1635 | | | | |
| Leu | Ala | Asp | Ala | Leu | Gly | Ala | Asp | Arg | Asp | Asp | Gln | Gly | Gln | Asp | |
| 1640 | | | | | | 1645 | | | | | 1650 | | | | |
| Gln | Glu | Thr | Ala | Gly | Arg | Ala | Leu | Leu | Val | Pro | Met | Arg | Leu | Thr | |
| 1655 | | | | | | 1660 | | | | | 1665 | | | | |
| Leu | Pro | Ala | Val | Ala | Pro | Gly | Ala | Glu | Val | Ala | Pro | Leu | Phe | Arg | |
| 1670 | | | | | | 1675 | | | | | 1680 | | | | |
| Gly | Leu | Val | Arg | Thr | Pro | Ala | Arg | Arg | Val | Ala | Ala | Gly | Ala | Thr | |
| 1685 | | | | | | 1690 | | | | | 1695 | | | | |
| Thr | Gly | Ala | Thr | Thr | Gly | Thr | Gly | Pro | Asp | Leu | Ser | Ala | Leu | Glu | |
| 1700 | | | | | | 1705 | | | | | 1710 | | | | |
| Arg | Arg | Leu | Leu | Gly | Leu | Asp | Ala | Pro | Glu | Arg | Glu | Arg | Leu | Leu | |
| 1715 | | | | | | 1720 | | | | | 1725 | | | | |
| Leu | Asp | Leu | Val | Arg | Gly | His | Val | Ala | Asp | Val | Leu | Gly | His | Gly | |
| 1730 | | | | | | 1735 | | | | | 1740 | | | | |
| Ser | Pro | Asp | Ala | Ile | Asp | Pro | Glu | Gln | Ala | Phe | Ser | Glu | Leu | Gly | |
| 1745 | | | | | | 1750 | | | | | 1755 | | | | |
| Phe | Asp | Ser | Leu | Thr | Ala | Val | Glu | Leu | Arg | Asn | Arg | Leu | Gly | Ala | |
| 1760 | | | | | | 1765 | | | | | 1770 | | | | |
| Ala | Ile | Gly | Arg | Arg | Leu | Pro | Ala | Thr | Leu | Ile | Phe | Asp | His | Pro | |
| 1775 | | | | | | 1780 | | | | | 1785 | | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Ala | Ser | Leu | Thr | Leu | Ala | Arg | His | Leu | Ser | Gly | Glu | Leu | Ala | Gly |
| 1790 | | | | | | 1795 | | | | | 1800 | | | |
| Ser | Gln | Ala | Ala | Leu | Ala | Pro | Ala | Gly | Pro | Ala | Pro | Thr | Val | Thr |
| 1805 | | | | | | 1810 | | | | | 1815 | | | |
| Asp | Asp | Asp | Pro | Ile | Ala | Ile | Val | Ala | Met | Ser | Cys | Arg | Tyr | Pro |
| 1820 | | | | | | 1825 | | | | | 1830 | | | |
| Gly | Gly | Val | Thr | Thr | Pro | Glu | Glu | Leu | Trp | Gln | Leu | Leu | Ala | Gly |
| 1835 | | | | | | 1840 | | | | | 1845 | | | |
| Gly | Gly | Asp | Ala | Ile | Ser | Gly | Phe | Pro | Ala | Asp | Arg | Gly | Trp | Asp |
| 1850 | | | | | | 1855 | | | | | 1860 | | | |
| Val | Glu | Ser | Leu | Tyr | Asp | Pro | Asp | Pro | Asp | His | Pro | Gly | Thr | Ser |
| 1865 | | | | | | 1870 | | | | | 1875 | | | |
| Tyr | Thr | Arg | His | Gly | Gly | Phe | Leu | Arg | Asp | Ala | Ala | Ala | Phe | Asp |
| 1880 | | | | | | 1885 | | | | | 1890 | | | |
| Pro | Thr | Phe | Phe | Gly | Ile | Ser | Pro | Arg | Glu | Ala | Val | Gly | Thr | Asp |
| 1895 | | | | | | 1900 | | | | | 1905 | | | |
| Pro | Gln | Gln | Arg | Leu | Leu | Leu | Glu | Thr | Thr | Trp | Glu | Ala | Phe | Glu |
| 1910 | | | | | | 1915 | | | | | 1920 | | | |
| Arg | Ala | Gly | Ile | Asp | Pro | Ala | Thr | Val | Arg | Gly | Ser | Arg | Thr | Gly |
| 1925 | | | | | | 1930 | | | | | 1935 | | | |
| Val | Phe | Ala | Gly | Val | Met | Tyr | His | Asp | Tyr | Ala | Ala | Leu | Leu | Glu |
| 1940 | | | | | | 1945 | | | | | 1950 | | | |
| Arg | Ser | Lys | Asp | Gly | Ala | Asp | Gly | Ser | Leu | Gly | Ser | Gly | Ser | Thr |
| 1955 | | | | | | 1960 | | | | | 1965 | | | |
| Gly | Ser | Ile | Ala | Ser | Gly | Arg | Val | Ser | Tyr | Thr | Phe | Gly | Leu | Glu |
| 1970 | | | | | | 1975 | | | | | 1980 | | | |
| Gly | Pro | Ala | Val | Thr | Ile | Asp | Thr | Ala | Cys | Ser | Ser | Ser | Leu | Val |
| 1985 | | | | | | 1990 | | | | | 1995 | | | |
| Ala | Leu | His | Met | Ala | Ile | Gln | Ala | Leu | Arg | Thr | Gly | Glu | Cys | Asp |
| 2000 | | | | | | 2005 | | | | | 2010 | | | |
| Met | Ala | Leu | Ala | Gly | Gly | Val | Thr | Val | Met | Ala | Thr | Pro | Gly | Thr |
| 2015 | | | | | | 2020 | | | | | 2025 | | | |
| Phe | Ile | Gly | Phe | Ser | Arg | Gln | Arg | Gly | Leu | Ser | Ala | Asp | Gly | Arg |
| 2030 | | | | | | 2035 | | | | | 2040 | | | |
| Cys | Arg | Ala | Phe | Ser | Ala | Asp | Ala | Asp | Gly | Thr | Gly | Trp | Gly | Glu |
| 2045 | | | | | | 2050 | | | | | 2055 | | | |
| Gly | Val | Gly | Met | Leu | Leu | Val | Glu | Arg | Leu | Ser | Asp | Ala | Arg | Arg |
| 2060 | | | | | | 2065 | | | | | 2070 | | | |
| Asn | Gly | His | Pro | Val | Leu | Ala | Val | Val | Arg | Gly | Ser | Ala | Ile | Asn |
| 2075 | | | | | | 2080 | | | | | 2085 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Gln | Asp | Gly | Ala | Ser | Asn | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ser |
| 2090 | | | | | | 2095 | | | | | 2100 | | | |
| Gln | Gln | Arg | Val | Ile | Arg | Ala | Ala | Leu | Ala | Ser | Ala | Gly | Leu | Ser |
| 2105 | | | | | | 2110 | | | | | 2115 | | | |
| Ala | Ala | Glu | Val | Asp | Ala | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Thr |
| 2120 | | | | | | 2125 | | | | | 2130 | | | |
| Leu | Gly | Asp | Pro | Ile | Glu | Ala | Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly |
| 2135 | | | | | | 2140 | | | | | 2145 | | | |
| Arg | Glu | His | Thr | Glu | Asp | Ser | Pro | Leu | Trp | Leu | Gly | Ser | Ile | Lys |
| 2150 | | | | | | 2155 | | | | | 2160 | | | |
| Ser | Asn | Met | Gly | His | Thr | Gln | Ala | Ala | Ala | Gly | Val | Ala | Gly | Val |
| 2165 | | | | | | 2170 | | | | | 2175 | | | |
| Ile | Lys | Met | Val | Leu | Ala | Ile | Gln | His | Gly | Val | Leu | Pro | Arg | Thr |
| 2180 | | | | | | 2185 | | | | | 2190 | | | |
| Leu | His | Ala | Asp | Arg | Pro | Ser | Pro | His | Val | Asp | Trp | Ser | Gln | Gly |
| 2195 | | | | | | 2200 | | | | | 2205 | | | |
| Ala | Val | Ser | Leu | Leu | Thr | Glu | Ser | Val | Pro | Trp | Pro | Glu | Thr | Gly |
| 2210 | | | | | | 2215 | | | | | 2220 | | | |
| Arg | Pro | Arg | Arg | Ala | Gly | Val | Ser | Ser | Phe | Gly | Ile | Ser | Gly | Thr |
| 2225 | | | | | | 2230 | | | | | 2235 | | | |
| Asn | Ala | His | Thr | Ile | Ile | Glu | Gln | Ala | Pro | Glu | Glu | Ala | Thr | Val |
| 2240 | | | | | | 2245 | | | | | 2250 | | | |
| Ala | Pro | Ala | Asp | Ala | Val | Ala | Ala | Pro | Ser | Ala | Leu | Pro | Leu | Gln |
| 2255 | | | | | | 2260 | | | | | 2265 | | | |
| Leu | Ala | Gly | Arg | Ser | Ala | Glu | Ala | Leu | Ser | Ala | Gln | Ala | Arg | Ala |
| 2270 | | | | | | 2275 | | | | | 2280 | | | |
| Leu | Ser | Ala | His | Leu | Thr | Ala | His | Pro | Asp | Val | Pro | Leu | Ala | Asp |
| 2285 | | | | | | 2290 | | | | | 2295 | | | |
| Leu | Ala | Tyr | Ser | Leu | Ala | Thr | Ser | Arg | Ala | Thr | Phe | Asp | His | Arg |
| 2300 | | | | | | 2305 | | | | | 2310 | | | |
| Ala | Val | Leu | Val | Ala | Thr | Glu | Gly | Thr | Thr | Ala | Ala | Thr | Ala | Val |
| 2315 | | | | | | 2320 | | | | | 2325 | | | |
| Thr | Ala | Leu | Asp | Ala | Leu | Ala | Asp | Arg | Arg | Thr | Ala | Pro | Gly | Leu |
| 2330 | | | | | | 2335 | | | | | 2340 | | | |
| Val | Arg | Gly | Thr | Ala | Ser | Lys | Gly | Gly | Arg | Thr | Ala | Phe | Leu | Phe |
| 2345 | | | | | | 2350 | | | | | 2355 | | | |
| Thr | Gly | Gln | Gly | Ser | Gln | Arg | Leu | Gly | Met | Gly | Arg | Glu | Leu | Tyr |
| 2360 | | | | | | 2365 | | | | | 2370 | | | |
| Glu | Ala | His | Pro | Val | Phe | Ala | Arg | Ala | Leu | Asp | Ala | Val | Cys | Asp |
| 2375 | | | | | | 2380 | | | | | 2385 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Arg | Leu | Glu | Leu | Pro | Leu | Lys | Asp | Val | Leu | Phe | Gly | Thr | Asp | Ala |
| 2390 | | | | | | 2395 | | | | | 2400 | | | |
| Gly | Leu | Leu | Asn | Glu | Thr | Val | Tyr | Thr | Gln | Pro | Gly | Leu | Phe | Ala |
| 2405 | | | | | | 2410 | | | | | 2415 | | | |
| Val | Glu | Val | Ala | Leu | Phe | Arg | Leu | Leu | Glu | Ser | Trp | Gly | Val | Lys |
| 2420 | | | | | | 2425 | | | | | 2430 | | | |
| Pro | Asp | Phe | Leu | Ala | Gly | His | Ser | Ile | Gly | Glu | Ile | Ala | Ala | Ala |
| 2435 | | | | | | 2440 | | | | | 2445 | | | |
| His | Val | Ala | Gly | Val | Leu | Ser | Leu | Asp | Asp | Val | Cys | Ala | Leu | Val |
| 2450 | | | | | | 2455 | | | | | 2460 | | | |
| Glu | Ala | Arg | Gly | Arg | Leu | Met | Gly | Ala | Leu | Pro | Gly | Gly | Gly | Val |
| 2465 | | | | | | 2470 | | | | | 2475 | | | |
| Met | Ile | Ala | Val | Gln | Ala | Ser | Glu | Ala | Glu | Val | Leu | Pro | Leu | Leu |
| 2480 | | | | | | 2485 | | | | | 2490 | | | |
| Thr | Asp | Arg | Val | Ser | Ile | Ala | Ala | Ile | Asn | Gly | Pro | Arg | Ser | Val |
| 2495 | | | | | | 2500 | | | | | 2505 | | | |
| Val | Ile | Ala | Gly | Asp | Glu | Ala | Asp | Ala | Val | Ala | Ile | Val | Glu | Ser |
| 2510 | | | | | | 2515 | | | | | 2520 | | | |
| Phe | Thr | Asp | Arg | Lys | Ser | Lys | Arg | Leu | Thr | Val | Ser | His | Ala | Phe |
| 2525 | | | | | | 2530 | | | | | 2535 | | | |
| His | Ser | Pro | His | Met | Asp | Gly | Met | Leu | Asp | Ala | Phe | Arg | Glu | Ile |
| 2540 | | | | | | 2545 | | | | | 2550 | | | |
| Ala | Glu | Gly | Leu | Ser | Tyr | Glu | Ala | Pro | Arg | Ile | Pro | Val | Val | Ser |
| 2555 | | | | | | 2560 | | | | | 2565 | | | |
| Asn | Leu | Thr | Gly | Ala | Leu | Val | Ser | Asp | Glu | Met | Gly | Ser | Ala | Asp |
| 2570 | | | | | | 2575 | | | | | 2580 | | | |
| Phe | Trp | Val | Arg | His | Val | Arg | Glu | Ala | Val | Arg | Phe | Leu | Asp | Gly |
| 2585 | | | | | | 2590 | | | | | 2595 | | | |
| Ile | His | Ala | Leu | Glu | Ala | Ala | Gly | Val | Thr | Thr | Tyr | Val | Glu | Leu |
| 2600 | | | | | | 2605 | | | | | 2610 | | | |
| Gly | Pro | Asp | Gly | Val | Leu | Ser | Ala | Met | Ala | Gln | Glu | Cys | Val | Thr |
| 2615 | | | | | | 2620 | | | | | 2625 | | | |
| Gly | Glu | Asp | Ser | Val | Phe | Val | Pro | Val | Leu | Arg | Ser | Gly | Arg | Pro |
| 2630 | | | | | | 2635 | | | | | 2640 | | | |
| Glu | Ala | Glu | Ser | Val | Thr | Thr | Ala | Leu | Ala | Gln | Ala | His | Val | Arg |
| 2645 | | | | | | 2650 | | | | | 2655 | | | |
| Gly | Ile | Ala | Val | Asp | Trp | Gln | Ala | Tyr | Phe | Ala | Gly | Thr | Ser | Ala |
| 2660 | | | | | | 2665 | | | | | 2670 | | | |
| Gln | Arg | Val | Asp | Leu | Pro | Thr | Tyr | Arg | Phe | Gln | Arg | Glu | His | Tyr |
| 2675 | | | | | | 2680 | | | | | 2685 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Trp | Pro | Glu | Thr | Gly | Ile | Pro | Leu | Pro | Gly | Asp | Thr | Ala | Gly | Leu |
| 2690 | | | | | | 2695 | | | | | 2700 | | | |
| Gly | Leu | Ala | Ala | Ala | Gly | His | Pro | Leu | Leu | Gly | Ala | Ala | Val | Thr |
| 2705 | | | | | | 2710 | | | | | 2715 | | | |
| Leu | Ala | Asp | Ala | Asp | Gly | Cys | Val | Leu | Thr | Gly | Arg | Leu | Ser | Leu |
| 2720 | | | | | | 2725 | | | | | 2730 | | | |
| Arg | Thr | His | Pro | Trp | Leu | Ala | Asp | His | Ala | Val | Met | Gly | Ser | Val |
| 2735 | | | | | | 2740 | | | | | 2745 | | | |
| Leu | Leu | Pro | Gly | Thr | Ala | Leu | Val | Glu | Leu | Ala | Leu | His | Ala | Gly |
| 2750 | | | | | | 2755 | | | | | 2760 | | | |
| Glu | Arg | Val | Gly | Thr | Arg | Ala | Leu | Asp | Glu | Leu | Thr | Leu | Gln | Ala |
| 2765 | | | | | | 2770 | | | | | 2775 | | | |
| Pro | Leu | Ile | Leu | Pro | Asn | Glu | Gly | Ala | Val | Gln | Leu | Gln | Val | Val |
| 2780 | | | | | | 2785 | | | | | 2790 | | | |
| Val | Gly | Ala | Pro | Asp | Ala | Ala | Gly | His | Arg | Thr | Val | Ala | Val | Tyr |
| 2795 | | | | | | 2800 | | | | | 2805 | | | |
| Ser | Arg | Pro | Asp | Ala | Asp | Gly | Glu | Ala | Trp | Val | Arg | His | Ala | Asp |
| 2810 | | | | | | 2815 | | | | | 2820 | | | |
| Gly | Leu | Leu | Val | Asp | Glu | Val | Arg | Gly | Ala | Ala | Ala | Asp | Leu | Gly |
| 2825 | | | | | | 2830 | | | | | 2835 | | | |
| Val | Trp | Pro | Pro | Ala | Gly | Ala | Thr | Ala | Val | Pro | Val | Asp | Asp | Ala |
| 2840 | | | | | | 2845 | | | | | 2850 | | | |
| Tyr | Ala | Ile | Leu | Glu | Thr | Ser | Gly | Leu | Ala | Tyr | Gly | Pro | Leu | Phe |
| 2855 | | | | | | 2860 | | | | | 2865 | | | |
| Gln | Gly | Leu | Arg | Ala | Ala | Trp | Arg | Arg | Ala | Gly | Glu | Leu | Phe | Ala |
| 2870 | | | | | | 2875 | | | | | 2880 | | | |
| Glu | Leu | Ala | Leu | Pro | Thr | Glu | Ala | Gln | Ala | Asp | Ala | Ala | Ala | Phe |
| 2885 | | | | | | 2890 | | | | | 2895 | | | |
| Gly | Leu | His | Pro | Ala | Leu | Leu | Asp | Ser | Ala | Leu | His | Thr | Leu | Ala |
| 2900 | | | | | | 2905 | | | | | 2910 | | | |
| Leu | Gly | Asp | Leu | Leu | Ser | Gly | Ala | Asp | Ala | Glu | Glu | Thr | Pro | Gly |
| 2915 | | | | | | 2920 | | | | | 2925 | | | |
| Ala | Ala | Arg | Leu | Pro | Phe | Ala | Trp | Arg | Gly | Val | Arg | Leu | His | Ala |
| 2930 | | | | | | 2935 | | | | | 2940 | | | |
| Ala | Gly | Ala | Pro | Ala | Val | Arg | Val | Arg | Leu | Ala | Glu | Ala | Gly | Gln |
| 2945 | | | | | | 2950 | | | | | 2955 | | | |
| Gly | Ala | Val | Ser | Leu | Glu | Leu | Ala | Asp | Ser | Ala | Gly | Ala | Pro | Val |
| 2960 | | | | | | 2965 | | | | | 2970 | | | |
| Ala | Ser | Val | Asp | Ser | Leu | Val | Leu | Arg | Ala | Met | Ser | Pro | Glu | Gln |
| 2975 | | | | | | 2980 | | | | | 2985 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Leu | Gly | Ala | Ala | Ser | Ala | Gly | Arg | Gln | Glu | Ser | Leu | Phe | Gln | Ile |
| 2990 | | | | | | 2995 | | | | | 3000 | | | |
| Asp | Trp | Val | Glu | Pro | Ala | Ala | Asp | Arg | Thr | Ala | Ala | Ala | Thr | Asp |
| 3005 | | | | | | 3010 | | | | | 3015 | | | |
| Val | Glu | Arg | Ala | Leu | Val | Gly | Pro | Glu | Leu | Arg | Gly | Leu | Asp | Ala |
| 3020 | | | | | | 3025 | | | | | 3030 | | | |
| Thr | Pro | Tyr | Ala | Asp | Leu | Ala | Ala | Leu | Ala | Ala | Ala | Asp | Ser | Asp |
| 3035 | | | | | | 3040 | | | | | 3045 | | | |
| Val | Pro | Glu | Leu | Val | Phe | Ile | Thr | Thr | Arg | Ala | Glu | Ser | Glu | Pro |
| 3050 | | | | | | 3055 | | | | | 3060 | | | |
| Glu | Gly | Leu | Pro | Gly | Thr | Val | His | Val | Arg | Ala | Val | Asp | Ala | Leu |
| 3065 | | | | | | 3070 | | | | | 3075 | | | |
| Thr | His | Val | Arg | Ala | Trp | Leu | Ala | Glu | Glu | Arg | Phe | Ala | Ser | Ala |
| 3080 | | | | | | 3085 | | | | | 3090 | | | |
| Arg | Leu | Val | Phe | Val | Thr | Arg | Gly | Ala | Met | Thr | Val | Gly | Ser | Asp |
| 3095 | | | | | | 3100 | | | | | 3105 | | | |
| Glu | Ala | Val | Arg | Asp | Leu | Ala | Gly | Ala | Ala | Val | Trp | Gly | Leu | Val |
| 3110 | | | | | | 3115 | | | | | 3120 | | | |
| Arg | Ser | Ala | Gly | Thr | Glu | His | Pro | Gly | Arg | Phe | Ala | Leu | Val | Asp |
| 3125 | | | | | | 3130 | | | | | 3135 | | | |
| Leu | Asp | Asp | Asp | Asp | Val | Leu | Pro | Glu | Gln | Thr | Val | Leu | Thr | Ala |
| 3140 | | | | | | 3145 | | | | | 3150 | | | |
| Leu | Ala | Ala | Gly | Glu | Ser | Glu | Leu | Val | Val | Arg | Glu | Gly | Ser | Leu |
| 3155 | | | | | | 3160 | | | | | 3165 | | | |
| Leu | Val | Pro | Arg | Leu | Ala | Arg | Ala | Ala | Val | Val | Glu | Gly | Ser | Gly |
| 3170 | | | | | | 3175 | | | | | 3180 | | | |
| Arg | Glu | Leu | Asp | Val | Asp | Gly | Thr | Val | Leu | Val | Thr | Gly | Ala | Ser |
| 3185 | | | | | | 3190 | | | | | 3195 | | | |
| Gly | Thr | Leu | Gly | Gly | Leu | Phe | Ala | Arg | His | Leu | Val | Val | Glu | Arg |
| 3200 | | | | | | 3205 | | | | | 3210 | | | |
| Gly | Val | Arg | Arg | Leu | Leu | Leu | Val | Ser | Arg | Arg | Gly | Gly | Ala | Ala |
| 3215 | | | | | | 3220 | | | | | 3225 | | | |
| Glu | Gly | Ala | Ala | Glu | Leu | Gly | Ala | Glu | Leu | Thr | Glu | Leu | Gly | Ala |
| 3230 | | | | | | 3235 | | | | | 3240 | | | |
| Asp | Val | Arg | Trp | Ala | Ala | Cys | Asp | Val | Ala | Asp | Arg | Glu | Ala | Leu |
| 3245 | | | | | | 3250 | | | | | 3255 | | | |
| Glu | Ser | Val | Leu | Ala | Gly | Ile | Pro | Ala | Glu | Tyr | Pro | Leu | Ser | Gly |
| 3260 | | | | | | 3265 | | | | | 3270 | | | |
| Val | Val | His | Thr | Ala | Gly | Val | Leu | Asp | Asp | Gly | Val | Val | Ser | Ser |
| 3275 | | | | | | 3280 | | | | | 3285 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Leu | Thr | Ala | Glu | Arg | Val | Ser | Ala | Val | Leu | Arg | Pro | Lys | Val | Asp |
| 3290 | | | | | | 3295 | | | | | 3300 | | | |
| Ala | Ala | Trp | Asn | Leu | His | Glu | Leu | Thr | Arg | Gly | Leu | Asp | Leu | Ser |
| 3305 | | | | | | 3310 | | | | | 3315 | | | |
| Leu | Phe | Val | Leu | Phe | Ser | Ser | Ala | Ala | Gly | Val | Phe | Gly | Gly | Ala |
| 3320 | | | | | | 3325 | | | | | 3330 | | | |
| Gly | Gln | Ala | Asn | Tyr | Ala | Ala | Ala | Asn | Val | Phe | Leu | Asp | Ala | Leu |
| 3335 | | | | | | 3340 | | | | | 3345 | | | |
| Ala | Gln | His | Arg | Arg | Ala | Gln | Gly | Leu | Ala | Ala | Thr | Ser | Leu | Ala |
| 3350 | | | | | | 3355 | | | | | 3360 | | | |
| Trp | Gly | Leu | Trp | Ala | Glu | Pro | Gly | Gly | Met | Ala | Gly | Ala | Leu | Asp |
| 3365 | | | | | | 3370 | | | | | 3375 | | | |
| Ala | Asp | Asp | Val | Ser | Arg | Leu | Gly | Arg | Gly | Gly | Val | Ser | Gly | Leu |
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| Ser | Ala | Gly | Glu | Gly | Val | Ala | Leu | Phe | Asp | Ala | Ala | Ser | Ala | Ser |
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| Leu | Val | Arg | Thr | Pro | Thr | Arg | Arg | Ala | Ala | Gly | Thr | Ala | Asn | Ala |
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| Glu | Gln | Val | Ala | His | Val | Leu | Glu | Leu | Val | Arg | Thr | Gln | Val | Ala |
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| Ala | Val | Leu | Gly | Tyr | Ala | Ser | Pro | Glu | Ala | Val | Glu | Lys | Asp | Ser |
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| Ser | Phe | Arg | Glu | Leu | Gly | Phe | Asp | Ser | Leu | Thr | Ala | Val | Glu | Leu |
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| Leu | Val | Phe | Asp | Tyr | Pro | Thr | Ser | Ala | Val | Leu | Ala | Asp | His | Leu |
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| Leu | Gly | Cys | Arg | Tyr | Pro | Gly | Gly | Val | Glu | Ser | Pro | Asp | Asp | Leu |
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| | | | | | | | | | | | | | | |
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| Trp | Arg | Leu | Val | Leu | Glu | Gly | Arg | Asp | Ala | Ile | Thr | Glu | Phe | Pro |
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| Asp | Gln | Gln | Gly | Thr | Ser | Tyr | Ala | Arg | Glu | Gly | Gly | Phe | Val | Arg |
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| Asp | Ala | Gly | His | Phe | Asp | Pro | Ala | Phe | Phe | Gly | Ile | Ser | Pro | Arg |
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| Glu | Ala | Val | Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | Leu | Leu | Glu | Thr |
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| Arg | Gly | Ser | Arg | Thr | Gly | Val | Phe | Ala | Gly | Val | Met | Tyr | His | Asp |
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| Tyr | Ala | Ser | Arg | Leu | Thr | Ala | Leu | Pro | Glu | Gly | Val | Glu | Gly | Phe |
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| Leu | Gly | Thr | Gly | Asn | Ala | Ala | Ser | Val | Ile | Ser | Gly | Arg | Leu | Ser |
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| Tyr | Ala | Phe | Gly | Leu | Glu | Gly | Pro | Ala | Ile | Thr | Val | Asp | Thr | Ala |
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| Cys | Ser | Ser | Ser | Leu | Val | Ala | Leu | His | Leu | Ala | Val | Gln | Ala | Leu |
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| Arg | Asn | Gly | Glu | Cys | Ser | Leu | Ala | Leu | Ala | Gly | Gly | Val | Thr | Val |
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| Leu | Ala | Ala | Asp | Gly | Arg | Cys | Lys | Ala | Phe | Ser | Ala | Gly | Ala | Asp |
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| Gly | Thr | Gly | Trp | Ser | Glu | Gly | Ala | Gly | Val | Leu | Leu | Val | Glu | Arg |
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| | | | | | | | | | | | | | | |
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| Ala | Gly | Val | Ala | Gly | Ile | Ile | Lys | Ile | Val | Gln | Ala | Met | Arg | His |
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| Gly | Val | Val | Pro | Lys | Thr | Leu | His | Val | Asp | Glu | Pro | Thr | Pro | His |
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| Val | Asp | Trp | Ser | Ala | Gly | Ala | Val | Ser | Leu | Leu | Thr | Glu | Gln | Val |
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| Ala | Trp | Pro | Glu | Thr | Gly | Arg | Pro | Arg | Arg | Ala | Ala | Ile | Ser | Ser |
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| Phe | Gly | Phe | Ser | Gly | Thr | Asn | Ala | His | Ala | Ile | Ile | Glu | Gln | Ala |
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| Pro | Asp | Pro | Ala | Pro | Glu | Asp | Leu | Pro | Asp | Ala | Gly | Pro | Asp | Val |
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| Arg | Pro | Glu | Pro | Ala | Arg | Thr | Pro | Gly | Ser | Leu | Pro | Trp | Leu | Leu |
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| Arg | Ala | His | Ala | Ile | Gly | His | Pro | Glu | Leu | Ser | Leu | Ala | Asp | Ile |
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| Gly | Tyr | Ala | Leu | Ala | Thr | Ser | Arg | Thr | Ala | Leu | Asp | Arg | Arg | Ala |
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| Ala | Leu | Ala | Glu | Gly | Ala | Thr | Ala | Ala | Gly | Leu | Thr | Glu | Gly | Ser |
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| Pro | Ala | Gly | Gly | Lys | Leu | Ala | Phe | Leu | Phe | Thr | Gly | Gln | Gly | Ser |
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| Gln | Arg | Leu | Ala | Met | Gly | Arg | Glu | Leu | Tyr | Ser | Ala | His | Pro | Val |
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| Phe | Ala | Arg | Ala | Leu | Asp | Ala | Val | Cys | Asp | Gly | Leu | Ala | Leu | Asp |
| 4130 | | | | | | 4135 | | | | | 4140 | | | |
| Val | Pro | Leu | Lys | Gln | Val | Leu | Phe | Gly | Ser | Asp | Ala | Asp | Leu | Leu |
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| Asp | Arg | Thr | Ala | Tyr | Thr | Gln | Pro | Ala | Leu | Phe | Ala | Val | Glu | Val |
| 4160 | | | | | | 4165 | | | | | 4170 | | | |
| Ala | Leu | Phe | Arg | Leu | Val | Glu | Ser | Trp | Gly | Leu | Lys | Pro | Asp | Phe |
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| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Leu | Ala | Gly | His | Ser | Ile | Gly | Glu | Ile | Thr | Ala | Ala | His | Val | Ala |
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| Gly | Arg | Leu | Met | Gln | Ala | Leu | Pro | Thr | Gly | Gly | Val | Met | Ile | Ala |
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| Val | Glu | Ala | Ser | Glu | Asp | Glu | Val | Leu | Pro | Leu | Leu | Thr | Asp | Arg |
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| Val | Ser | Ile | Ala | Ala | Ile | Asn | Gly | Pro | Gln | Ser | Val | Val | Ile | Ala |
| 4250 | | | | | | 4255 | | | | | 4260 | | | |
| Gly | Asp | Glu | Ala | Asp | Ala | Val | Ala | Ile | Ala | Glu | Ser | Phe | Thr | Gly |
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| Arg | Lys | Ser | Lys | Arg | Leu | Thr | Val | Ser | His | Ala | Phe | His | Ser | Pro |
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| His | Met | Asp | Gly | Met | Leu | Asp | Ala | Phe | Arg | Glu | Val | Ala | Glu | Gly |
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| Leu | Ser | Tyr | Gly | Thr | Pro | Leu | Ile | Pro | Val | Val | Ser | His | Leu | Thr |
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| Gly | Thr | Leu | Val | Thr | Asp | Glu | Met | Arg | Ser | Pro | Asp | Phe | Trp | Val |
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| Arg | His | Val | Arg | Glu | Ala | Val | Arg | Phe | Leu | Asp | Gly | Ile | Arg | Thr |
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| Leu | Glu | Asp | Ala | Gly | Val | Thr | Thr | Tyr | Ile | Glu | Leu | Gly | Pro | Gly |
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| Gly | Val | Leu | Ser | Ala | Met | Gly | Gln | Ser | Cys | Val | Thr | Arg | Asp | Asp |
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| Ala | Ala | Phe | Leu | Pro | Ala | Leu | Arg | Ala | Asp | Arg | Ser | Glu | Glu | Glu |
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| Thr | Leu | Thr | Ser | Ala | Val | Ala | Arg | Ala | His | Leu | Arg | Gly | Ile | Thr |
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| Gly | Ser | Ala | Gly | His | Pro | Leu | Leu | Gly | Ala | Ala | Val | Glu | Leu | Pro |
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| Asp | Ser | Asp | Gly | Phe | Leu | Phe | Thr | Gly | Arg | Leu | Ser | Leu | Arg | Thr |
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| | |
|-------------------------|-------------------------------------|
| His Pro Trp Leu Gly Asp | His Arg Val Ala Gly Thr Val Leu Leu |
| 4490 | 4495 4500 |
| Pro Gly Ala Ala Leu Leu | Glu Leu Ala Val Arg Ala Gly Asp His |
| 4505 | 4510 4515 |
| Ala Gly Cys Asp Leu Leu | Glu Asp Leu Thr Leu Glu Ala Pro Leu |
| 4520 | 4525 4530 |
| Val Leu Pro Glu Ala Gly | Gly Val Gln Leu Arg Leu Val Val Ala |
| 4535 | 4540 4545 |
| Glu Pro Asp Ala Ser Arg | Arg Arg Val Phe His Ile Tyr Ser Arg |
| 4550 | 4555 4560 |
| Pro Glu Asp Ala Ala Phe | Glu Glu Pro Trp Thr Arg His Ala Gly |
| 4565 | 4570 4575 |
| Gly Val Leu Ala Val Glu | Gly Ala His Pro Ala Glu Ala Glu Ser |
| 4580 | 4585 4590 |
| Glu Trp Pro Pro Ala Gly | Ala Val Pro Cys Pro Val Glu Asp Leu |
| 4595 | 4600 4605 |
| Tyr Pro Ser Leu Asp Ala | Ile Gly Leu Gly Tyr Gly Pro Ala Phe |
| 4610 | 4615 4620 |
| Arg Asn Leu Leu Leu Ala | Trp Lys Arg Gly Asp Glu Val Phe Ala |
| 4625 | 4630 4635 |
| Glu Val Ala Leu Gly Glu | Asp Arg Arg Thr Glu Gly Ala Leu Tyr |
| 4640 | 4645 4650 |
| Gly Leu His Pro Ala Leu | Leu Asp Ala Ala Leu His Ala Val Gly |
| 4655 | 4660 4665 |
| Leu Gly Asp Phe Phe Pro | Asp Gly Pro Glu Gly Ala Arg Leu Pro |
| 4670 | 4675 4680 |
| Phe Ser Trp Asp Gly Val | Arg Leu His Ala Val Gly Ala Ala Ala |
| 4685 | 4690 4695 |
| Leu Arg Val Arg Met Ala | Pro Ala Gly Gln Asp Ala Val Thr Leu |
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| Ala Val Ser Asp Glu Thr | Gly Arg Pro Val Leu Thr Val Asp Ser |
| 4715 | 4720 4725 |
| Leu Val Leu Arg Pro Leu | Ala Leu Asp Gly Pro Gly Gly Leu Gly |
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| Gly Ala Gly Arg Gly Pro | Gly Ser Val Arg Asp Ala Leu Phe Gln |
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| Val Asp Trp His Ala Leu | Pro Leu Pro Glu Ala Gln Ser Pro Ala |
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| Glu Gly Arg Trp Ala Leu | Leu Gly Gly Asp Pro Leu Lys Leu Ala |
| 4775 | 4780 4785 |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
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| Gly | Thr | Ala | Ser | Glu | Asp | Thr | Gly | Gly | His | Pro | Arg | Asp | Leu | Ser |
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| Ala | Leu | Ala | Asp | Ala | Val | Glu | Leu | Ala | Glu | Ala | Leu | Gly | Glu | Pro |
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| Ala | Pro | Glu | Thr | Val | Leu | Val | Ser | Leu | Ala | Pro | Asp | Leu | Ala | Ala |
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| Thr | Gly | Gly | Leu | Ala | Ser | Ala | Ala | His | Arg | Ala | Ala | Ala | Asp | Ala |
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| Leu | Glu | Leu | Ile | Gln | Ala | Trp | Leu | Ala | Asp | Glu | Arg | Leu | Ala | Gly |
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| Ser | Arg | Leu | Ala | Leu | Val | Thr | Arg | Gly | Ala | Val | Ala | Thr | Asp | Pro |
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| Asp | Ala | Asp | Val | Asp | Asp | Leu | Ala | His | Ala | Ala | Val | Trp | Gly | Leu |
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| His | Pro | Leu | Thr | Ala | Val | Val | His | Thr | Ala | Gly | Val | Leu | Asp | Asp |
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| Gly | Thr | Val | Glu | Ser | Leu | Thr | Ala | Gly | Arg | Met | Ala | Thr | Val | Leu |
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| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
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| Gly | Leu | Asp | Leu | Ala | Ala | Phe | Val | Leu | Phe | Ser | Ser | Ala | Ala | Gly |
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| Phe | Leu | Asp | Ala | Leu | Ala | Gln | His | Arg | Arg | Ala | Gln | Gly | Leu | Thr |
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| Ser | Met | Asn | Pro | Leu | Ser | Val | Ala | Glu | Gly | Leu | Ala | Leu | Phe | Asp |
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| Ala | Ala | Leu | Pro | Gly | Gly | Ala | Ser | Ser | Gly | Ala | Val | Pro | Glu | Gly |
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| Ala | Arg | Thr | Ala | Ser | Val | Leu | Val | Pro | Ala | Arg | Leu | Asp | Leu | Ala |
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| Val | Leu | Gln | Ala | Gln | Val | Gly | Asp | Leu | Val | Pro | Pro | Leu | Leu | Arg |
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| Gly | Leu | Leu | Arg | Thr | Pro | Val | Arg | Arg | Arg | Ala | Ser | Gly | Ala | Ala |
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| Ala | Asp | Ala | Pro | Asp | Ser | Leu | Ala | Gln | Arg | Leu | Ala | Gln | Leu | Pro |
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| Pro | Ala | Glu | Arg | Asp | Arg | Val | Leu | Leu | Asp | Leu | Val | Cys | Thr | Gln |
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| Gly | Ser | Ala | Phe | Lys | Glu | Leu | Gly | Phe | Asp | Ser | Leu | Thr | Ala | Val |
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| Ala | Thr | Leu | Ile | Phe | Asp | Tyr | Pro | Thr | Pro | Glu | Ala | Leu | Ser | Gly |
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| His | Leu | Arg | Ser | Ala | Leu | Pro | Leu | Asp | Glu | Asp | Gly | Pro | Ser | Val |
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| Ala | Asp | Ser | Val | Thr | Arg | Ser | Arg | Ile | Thr | Met | Arg | Leu | Gln | Ala |
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Leu Met Thr Lys Trp Asn Asp Ala Gln Asp Ala Asn Gly Gly Ala
 5390 5395 5400
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 Asp Glu Leu Phe Asp Leu Leu Asp Asn Glu Leu Gly Ala Ser
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| | | | | | | |
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 <211> 3227
 <212> PRT
 <213> Streptomyces aizunensis

<400> 33

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Val | Asn | Glu | Asp | Lys | Leu | Arg | Asp | Tyr | Leu | Lys | Arg | Ala | Thr | Ala | 1 | 5 | 10 | 15 |
| Asp | Leu | Arg | Gln | Ala | Arg | Arg | Arg | Leu | Arg | Glu | Val | Glu | Asp | Lys | Asn | 20 | 25 | 30 | |
| Gln | Glu | Pro | Ile | Ala | Ile | Val | Ala | Met | Ser | Cys | Arg | Tyr | Pro | Gly | Gly | 35 | 40 | 45 | |
| Val | Arg | Ser | Pro | Glu | Asp | Leu | Trp | Arg | Leu | Val | Glu | Asn | Gly | Asp | Asp | 50 | 55 | 60 | |
| Ala | Val | Ser | Gly | Phe | Pro | Val | Asp | Arg | Gly | Trp | Asp | Val | Glu | Ala | Leu | 65 | 70 | 75 | 80 |
| Tyr | Asp | Ala | Asp | Pro | Asp | Ser | Ser | Gly | Ser | Ser | Tyr | Val | Ser | Glu | Gly | 85 | 90 | 95 | |
| Gly | Phe | Leu | Tyr | Asp | Ala | Ala | Ser | Phe | Asp | Pro | Ala | Pro | Phe | Gly | Ile | 100 | 105 | 110 | |
| Ser | Pro | Arg | Glu | Ala | Leu | Ala | Met | Asp | Pro | Gln | Gln | Arg | Leu | Leu | Leu | 115 | 120 | 125 | |
| Glu | Ala | Ser | Trp | Glu | Ala | Phe | Glu | Arg | Ala | Gly | Ile | Asp | Pro | Ser | Ser | 130 | 135 | 140 | |
| Val | Arg | Gly | Ser | Arg | Thr | Ala | Val | Phe | Ala | Gly | Val | Met | Tyr | His | Asp | 145 | 150 | 155 | 160 |
| Tyr | Thr | Ala | Arg | Leu | Asp | Ser | Val | Pro | Glu | Gly | Val | Glu | Gly | Phe | Leu | 165 | 170 | 175 | |

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Gly | Thr | Gly | Ser | Ser | Gly | Ser | Ile | Ala | Ser | Gly | Arg | Val | Ala | Tyr | Thr | | |
| | | | 180 | | | | | 185 | | | | | 190 | | | | |
| Phe | Gly | Leu | Glu | Gly | Pro | Ala | Val | Thr | Val | Asp | Thr | Ala | Cys | Ser | Ser | | |
| | | 195 | | | | | 200 | | | | | 205 | | | | | |
| Ser | Leu | Val | Thr | Leu | His | Leu | Ala | Val | Gln | Ala | Leu | Arg | Ala | Gly | Glu | | |
| | 210 | | | | | 215 | | | | | 220 | | | | | | |
| Cys | Ser | Met | Ala | Leu | Ala | Gly | Gly | Val | Thr | Val | Met | Ala | Thr | Pro | Ala | | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | | |
| Thr | Phe | Thr | Glu | Phe | Ser | Arg | Gln | Arg | Gly | Leu | Ala | Pro | Asp | Gly | Arg | | |
| | | | | 245 | | | | | 250 | | | | | 255 | | | |
| Cys | Lys | Pro | Phe | Ala | Ala | Ala | Ala | Asp | Gly | Thr | Gly | Trp | Gly | Glu | Gly | | |
| | | | 260 | | | | | 265 | | | | | 270 | | | | |
| Val | Gly | Met | Leu | Leu | Val | Glu | Arg | Leu | Ser | Asp | Ala | Gln | Arg | Asn | Gly | | |
| | | 275 | | | | | 280 | | | | | 285 | | | | | |
| His | Pro | Ile | Leu | Ala | Val | Val | Arg | Gly | Ser | Ala | Ile | Asn | Gln | Asp | Gly | | |
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| Ala | Ser | Asn | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln | Arg | Val | | |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 | | |
| Ile | His | Gln | Ala | Leu | Thr | Asn | Ala | Arg | Leu | Ser | Ala | Ala | Asp | Val | Asp | | |
| | | | | 325 | | | | | 330 | | | | | 335 | | | |
| Val | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Thr | Leu | Gly | Asp | Pro | Ile | Glu | | |
| | | | 340 | | | | | 345 | | | | | 350 | | | | |
| Ala | Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Gln | Asp | Arg | Pro | Ala | Gly | Arg | | |
| | | 355 | | | | | 360 | | | | | 365 | | | | | |
| Pro | Leu | Leu | Leu | Gly | Ser | Ile | Lys | Ser | Asn | Ile | Gly | His | Thr | Gln | Ala | | |
| | 370 | | | | | 375 | | | | | 380 | | | | | | |
| Ala | Ala | Gly | Val | Ala | Ser | Ile | Ile | Lys | Met | Val | Glu | Ala | Met | Arg | His | | |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 | | |
| Gly | Val | Val | Pro | Lys | Thr | Leu | His | Leu | Asp | Glu | Pro | Thr | Pro | His | Val | | |
| | | | | 405 | | | | | 410 | | | | | 415 | | | |
| Asp | Trp | Glu | Ala | Gly | Ala | Val | Ser | Leu | Ile | Gly | Glu | Lys | Ile | Ala | Trp | | |
| | | | 420 | | | | | 425 | | | | | 430 | | | | |
| Pro | Glu | Thr | Gly | Glu | Leu | Arg | Arg | Ala | Gly | Val | Ser | Ser | Phe | Gly | Phe | | |
| | | 435 | | | | | 440 | | | | | 445 | | | | | |
| Ser | Gly | Thr | Asn | Ala | His | Val | Ile | Val | Glu | Gln | Ala | Pro | Val | Val | Glu | | |
| | 450 | | | | | 455 | | | | | 460 | | | | | | |
| Glu | Val | Ala | Gly | Asp | Pro | Ala | Gly | Glu | Val | Glu | Gly | Ser | Glu | Leu | Ala | | |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 | | |
| Val | Val | Pro | Trp | Val | Leu | Ser | Gly | Lys | Ser | Ala | Gly | Ala | Leu | Arg | Ala | | |
| | | | | 485 | | | | 490 | | | | | | 495 | | | |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gln | Ala | Glu | Arg | Leu | Ser | Gly | Trp | Leu | Ala | Gly | Ala | Ser | Ala | Ala | Gly | 500 | 505 | 510 |
| Val | Ala | Ser | Val | Asp | Val | Gly | Trp | Ser | Leu | Ala | Ser | Ser | Arg | Ala | Gly | 515 | 520 | 525 |
| Leu | Glu | His | Arg | Ala | Val | Val | Leu | Gly | Asp | His | Ala | Ala | Gly | Val | Gly | 530 | 535 | 540 |
| Ala | Val | Ala | Ser | Gly | Val | Met | Ala | Ala | Gly | Val | Val | Thr | Gly | Ser | Val | 545 | 550 | 555 |
| Val | Gly | Gly | Lys | Thr | Ala | Phe | Val | Phe | Pro | Gly | Gln | Gly | Ser | Gln | Trp | 565 | 570 | 575 |
| Val | Gly | Met | Ala | Val | Gly | Leu | Leu | Asp | Ser | Ser | Pro | Val | Phe | Ala | Ala | 580 | 585 | 590 |
| Arg | Val | Asp | Glu | Cys | Ala | Lys | Ala | Leu | Glu | Pro | Phe | Thr | Asp | Trp | Ser | 595 | 600 | 605 |
| Leu | Val | Asp | Val | Leu | Arg | Gly | Val | Glu | Gly | Ala | Pro | Ser | Leu | Glu | Arg | 610 | 615 | 620 |
| Val | Asp | Val | Val | Gln | Pro | Ala | Leu | Phe | Ala | Val | Met | Val | Ser | Leu | Ala | 625 | 630 | 635 |
| Glu | Val | Trp | Arg | Ala | Ala | Gly | Val | Arg | Pro | Gly | Ala | Val | Ile | Gly | His | 645 | 650 | 655 |
| Ser | Gln | Gly | Glu | Ile | Ala | Ala | Ala | Cys | Val | Ala | Gly | Ile | Leu | Ser | Leu | 660 | 665 | 670 |
| Glu | Asp | Ala | Ala | Arg | Val | Val | Ala | Leu | Arg | Ser | Gln | Ala | Ile | Gly | Arg | 675 | 680 | 685 |
| Val | Leu | Ala | Gly | Leu | Gly | Gly | Met | Val | Ser | Val | Pro | Leu | Pro | Ala | Lys | 690 | 695 | 700 |
| Ala | Val | Arg | Glu | Leu | Ile | Ala | Pro | Trp | Gly | Glu | Gly | Arg | Ile | Ser | Val | 705 | 710 | 715 |
| Ala | Ala | Val | Asn | Gly | Pro | Ser | Ser | Val | Val | Val | Ser | Gly | Glu | Ala | Ala | 725 | 730 | 735 |
| Ala | Leu | Asp | Glu | Met | Leu | Ala | Ser | Cys | Glu | Ser | Glu | Gly | Val | Arg | Ala | 740 | 745 | 750 |
| Lys | Arg | Ile | Ala | Val | Asp | Tyr | Ala | Ser | His | Ser | Ala | Gln | Val | Glu | Leu | 755 | 760 | 765 |
| Leu | Arg | Glu | Glu | Leu | Ala | Glu | Leu | Leu | Ala | Pro | Ile | Val | Pro | Arg | Ala | 770 | 775 | 780 |
| Ala | Glu | Val | Pro | Phe | Leu | Ser | Thr | Val | Thr | Gly | Glu | Trp | Val | Arg | Gly | 785 | 790 | 795 |
| Pro | Glu | Leu | Asp | Ala | Gly | Tyr | Trp | Phe | Gln | Asn | Leu | Arg | Arg | Thr | Val | 805 | 810 | 815 |

Glu Leu Glu Glu Ala Thr Arg Thr Leu Leu Glu Gln Gly Phe Gly Val
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 Phe Val Glu Ser Ser Pro His Pro Val Leu Ser Val Gly Met Gln Glu
 835 840 845
 Thr Val Glu Asp Ala Gly Arg Glu Ala Ala Val Leu Gly Ser Leu Arg
 850 855 860
 Arg Gly Glu Gly Gly Leu Glu Arg Phe Trp Leu Ser Leu Gly Glu Ala
 865 870 875 880
 Trp Val Arg Gly Val Ala Val Asp Trp His Ala Val Phe Ala Gly Thr
 885 890 895
 Gly Ala Arg Arg Val Asp Leu Pro Thr Tyr Ala Phe Gln Gln Glu His
 900 905 910
 Tyr Trp Leu Glu Ser Gly Thr Ala Glu Asp Val Thr Ala Thr Ala His
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 Pro Val Asp Ala Val Glu Ala Arg Phe Trp Glu Ala Val Glu Arg Gln
 930 935 940
 Asp Val Ala Ala Leu Thr Ala Glu Leu Asp Val Asp Glu Asn Glu Asn
 945 950 955 960
 Leu Thr Ala Leu Leu Pro Ala Leu Ser Ser Trp Arg Arg Gln Ser Arg
 965 970 975
 Glu Arg Ser Ala Val Asp Gly Trp Arg Tyr Arg Val Thr Trp Lys Pro
 980 985 990
 Ala Pro Glu Pro Thr Thr Ala Arg Leu Ser Gly Thr Trp Leu Val Ala
 995 1000 1005
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 1040 1045 1050
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 1055 1060 1065
 Leu Thr Pro Ala Gly Ala Asp Glu Pro Phe Gln Val Ser Ala Pro
 1070 1075 1080
 Gly Gly Val Ile Thr Thr Leu Ser Leu Val Gln Ala Leu Gly Asp
 1085 1090 1095
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 Ala Thr Gly Arg Ser Glu Gln Val Ala Asp Pro Ala Gln Ala Pro
 1115 1120 1125

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|-------------------------|-------------------------|-----------------|
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| Trp Gly Gly Leu Ile Asp | Leu Pro Gly Thr Asp | Ala Val Asp Asp |
| 1145 | 1150 | 1155 |
| Arg Ala Leu Ala Arg Leu | Ala Gly Val Leu Ala | Gly Asp Ala Ala |
| 1160 | 1165 | 1170 |
| Glu Asp Gln Val Ala Val | Arg Ala Ser Gly Leu | Phe Val Arg Arg |
| 1175 | 1180 | 1185 |
| Leu Val Arg Val Arg Leu | Ala Glu Thr Pro Val | Val Arg Glu Trp |
| 1190 | 1195 | 1200 |
| Arg Pro Gln Gly Thr Thr | Leu Val Thr Gly Gly | Thr Gly Ala Leu |
| 1205 | 1210 | 1215 |
| Gly Ala His Val Ala Arg | Trp Leu Ala Glu Asn | Gly Ala Glu His |
| 1220 | 1225 | 1230 |
| Leu Leu Leu Thr Ser Arg | Arg Gly Pro Asp Ala | Pro Gly Ala Ala |
| 1235 | 1240 | 1245 |
| Ala Leu Arg Asp Glu Leu | Thr Ala Leu Gly Ala | Gln Val Thr Ile |
| 1250 | 1255 | 1260 |
| Ala Ala Cys Asp Val Ser | Asp Arg Asp Ala Val | Ala Ala Leu Ile |
| 1265 | 1270 | 1275 |
| Ala Ala Val Pro Ala Asp | Gln Pro Leu Thr Ala | Val Val His Thr |
| 1280 | 1285 | 1290 |
| Ala Ala Val Leu Asp Asp | Gly Val Ile Glu Ala | Leu Thr Pro Glu |
| 1295 | 1300 | 1305 |
| Gln Ile Glu Arg Val Leu | Arg Val Lys Val Asp | Ala Thr Leu His |
| 1310 | 1315 | 1320 |
| Leu His Glu Leu Thr Arg | Glu Leu Asp Leu Ser | Ala Phe Val Phe |
| 1325 | 1330 | 1335 |
| Phe Ser Ser Phe Ala Ala | Thr Phe Gly Ala Pro | Gly Gln Gly Asn |
| 1340 | 1345 | 1350 |
| Tyr Ala Pro Gly Asn Ala | Phe Leu Asp Ala Phe | Ala Glu Tyr Arg |
| 1355 | 1360 | 1365 |
| Arg Ala Ser Gly Leu Pro | Ala Thr Ser Ile Ala | Trp Gly Pro Trp |
| 1370 | 1375 | 1380 |
| Gly Asp Gly Gly Met Ala | Glu Gly Ala Val Gly | Asp Arg Met Arg |
| 1385 | 1390 | 1395 |
| Arg His Gly Val Ile Glu | Met Ser Pro Glu Arg | Ala Val Ala Ala |
| 1400 | 1405 | 1410 |
| Leu Gln His Ala Leu Asp | Arg Asp Glu Thr Thr | Leu Thr Val Ala |
| 1415 | 1420 | 1425 |

| | | | |
|---------|---------------------|-------------------------|-----------------|
| Asp Met | Glu Trp Lys Arg | Phe Val Leu Ala Phe Thr | Ser Gly Arg |
| 1430 | | 1435 | 1440 |
| Ala Arg | Pro Leu Leu His | Asp Leu Pro Glu Ala Arg | Glu Val Met |
| 1445 | | 1450 | 1455 |
| Asp Ala | Thr Arg Thr Glu | Ala Ala Glu Asp Thr Gly | Ser Ala Ala |
| 1460 | | 1465 | 1470 |
| Ala Leu | Ala Gln Gln Leu Thr | Gly Arg Pro Glu Ala | Glu Gln Glu |
| 1475 | | 1480 | 1485 |
| Arg Leu | Leu Leu Glu Leu Val | Arg Thr Ala Val Ala | Ala Val Leu |
| 1490 | | 1495 | 1500 |
| Gly Tyr | Ala Gly Pro Asp | Ala Val Glu Ala Gly Arg | Ala Phe Lys |
| 1505 | | 1510 | 1515 |
| Glu Leu | Gly Phe Asp Ser | Leu Thr Ser Val Glu Leu | Arg Asn Arg |
| 1520 | | 1525 | 1530 |
| Leu Asn | Ala Ala Ser Gly | Leu Lys Leu Pro Pro Thr | Leu Val Phe |
| 1535 | | 1540 | 1545 |
| Asp His | Pro Thr Pro Thr | Val Leu Ala Arg His | Leu Arg Ala Glu |
| 1550 | | 1555 | 1560 |
| Phe Phe | Gly Gln Gly Ala | Ala Ala Val Pro Val | Pro Met Ala |
| 1565 | | 1570 | 1575 |
| Ala Val | Ser Asp Asp Glu | Pro Ile Ala Ile Val Ala | Met Ser Cys |
| 1580 | | 1585 | 1590 |
| Arg Phe | Pro Gly Gly Val | Arg Asn Pro Glu Glu Leu | Trp Gln Leu |
| 1595 | | 1600 | 1605 |
| Leu Thr | Ser Glu Gly Asp | Gly Leu Ser Gln Phe Pro | Leu Asp Arg |
| 1610 | | 1615 | 1620 |
| Gly Trp | Asp Val Asp Ala | Leu Tyr Asp Pro Asn Pro | Asp Ala Gln |
| 1625 | | 1630 | 1635 |
| Gly Thr | Ser Tyr Thr Arg | Glu Gly Gly Phe Leu Ser | Asp Ala Ala |
| 1640 | | 1645 | 1650 |
| Ala Phe | Asp Ser Ser Phe | Phe Gly Ile Ser Pro Arg | Glu Ala Leu |
| 1655 | | 1660 | 1665 |
| Ala Met | Asp Pro Gln Gln | Arg Leu Leu Leu Glu Thr | Ser Trp Glu |
| 1670 | | 1675 | 1680 |
| Ala Phe | Glu Arg Ala Gly | Ile Asp Pro Gln Thr Leu | Arg Gly Ser |
| 1685 | | 1690 | 1695 |
| Gln Ser | Gly Val Phe Val | Gly Thr Asn Gly Ser Asp | Tyr Ser Asn |
| 1700 | | 1705 | 1710 |
| Leu Val | Arg Ala Gly Ala | Asp Gly Leu Glu Gly His | Leu Ala Thr |
| 1715 | | 1720 | 1725 |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Gly | Asn | Ala | Gly | Ser | Val | Val | Ser | Gly | Arg | Leu | Ser | Tyr | Thr | Phe |
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| Gly | Leu | Glu | Gly | Pro | Ala | Val | Thr | Val | Asp | Thr | Ala | Cys | Ser | Ala |
| 1745 | | | | | | 1750 | | | | | 1755 | | | |
| Ser | Leu | Val | Ala | Leu | His | Leu | Ala | Val | Gln | Ala | Leu | Arg | Ser | Gly |
| 1760 | | | | | | 1765 | | | | | 1770 | | | |
| Glu | Cys | Ser | Leu | Ala | Leu | Ala | Gly | Gly | Val | Thr | Val | Met | Ser | Thr |
| 1775 | | | | | | 1780 | | | | | 1785 | | | |
| Pro | Gly | Thr | Phe | Ile | Glu | Phe | Ser | Arg | Gln | Arg | Gly | Leu | Ser | Thr |
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| Asp | Gly | Arg | Cys | Lys | Ala | Phe | Ser | Ser | Asp | Ala | Asp | Gly | Phe | Ser |
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| Pro | Ala | Glu | Gly | Val | Gly | Val | Leu | Leu | Val | Glu | Arg | Leu | Ser | Asp |
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| Ala | Arg | Arg | Asn | Gly | His | Pro | Ile | Leu | Ala | Val | Val | Arg | Gly | Ser |
| 1835 | | | | | | 1840 | | | | | 1845 | | | |
| Ala | Ile | Asn | Gln | Asp | Gly | Ala | Ser | Asn | Gly | Leu | Thr | Ala | Pro | Asn |
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| 1865 | | | | | | 1870 | | | | | 1875 | | | |
| Arg | Leu | Ser | Ala | Ala | Asp | Val | Asp | Val | Val | Glu | Ala | His | Gly | Thr |
| 1880 | | | | | | 1885 | | | | | 1890 | | | |
| Gly | Thr | Thr | Leu | Gly | Asp | Pro | Ile | Glu | Ala | Gln | Ala | Leu | Leu | Ala |
| 1895 | | | | | | 1900 | | | | | 1905 | | | |
| Thr | Tyr | Gly | Gln | Asp | Arg | Pro | Ala | Gly | Arg | Pro | Leu | Leu | Leu | Gly |
| 1910 | | | | | | 1915 | | | | | 1920 | | | |
| Ser | Ile | Lys | Ser | Asn | Ile | Gly | His | Ala | Gln | Ala | Ala | Ala | Gly | Val |
| 1925 | | | | | | 1930 | | | | | 1935 | | | |
| Ala | Gly | Val | Met | Lys | Met | Val | Leu | Ala | Met | Gln | His | Gly | Val | Leu |
| 1940 | | | | | | 1945 | | | | | 1950 | | | |
| Pro | Gln | Ser | Leu | His | Ile | Ala | Glu | Pro | Thr | Pro | His | Val | Asp | Trp |
| 1955 | | | | | | 1960 | | | | | 1965 | | | |
| Ser | Ala | Gly | Glu | Val | Ala | Leu | Leu | Thr | Glu | Glu | Arg | Ala | Trp | Pro |
| 1970 | | | | | | 1975 | | | | | 1980 | | | |
| Glu | Thr | Gly | Arg | Pro | Trp | Arg | Ala | Gly | Val | Ser | Ser | Phe | Gly | Phe |
| 1985 | | | | | | 1990 | | | | | 1995 | | | |
| Ser | Gly | Thr | Asn | Ala | His | Ala | Ile | Ile | Glu | Gln | Ala | Pro | Ala | Glu |
| 2000 | | | | | | 2005 | | | | | 2010 | | | |
| Ala | Gly | Ser | Asp | Asp | Asp | Arg | Glu | Thr | Pro | Glu | Pro | Ser | Ala | Gln |
| 2015 | | | | | | 2020 | | | | | 2025 | | | |

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Pro | Leu | Leu | Val | Ala | Pro | Thr | Arg | Asp | Asp | Ser | Ala | Ser | Ala | Arg |
| 2030 | | | | | | 2035 | | | | | 2040 | | | |
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| Asp | Ser | Val | Ser | Asp | Arg | Pro | Gly | Val | Leu | Pro | Trp | Thr | Leu | Thr |
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| Ala | Lys | Thr | Glu | Lys | Ala | Leu | Gln | Gly | Gln | Ala | Glu | Arg | Leu | Leu |
| 2075 | | | | | | 2080 | | | | | 2085 | | | |
| Thr | Gln | Leu | Thr | Thr | Arg | Ser | Asp | Leu | Arg | Leu | Val | Asp | Val | Gly |
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| His | Ser | Leu | Ala | Thr | Thr | Arg | Thr | Ala | Leu | Asp | Gln | Arg | Ala | Val |
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| Leu | Ile | Gly | Arg | Asp | Arg | Pro | Asp | Tyr | Leu | Gly | Ala | Leu | Thr | Ala |
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| Val | Gly | Gly | Lys | Thr | Ala | Phe | Val | Phe | Pro | Gly | Gln | Gly | Ser | Gln |
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| Asp | Ala | Val | Ile | Gly | His | Ser | Gln | Gly | Glu | Ile | Ala | Ala | Ala | Cys |
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| Glu | Glu | Leu | Ala | Glu | Leu | Leu | Ala | Pro | Ile | Val | Pro | Arg | Ala | Ala |
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| Gly | Ser | Leu | Arg | Arg | Gly | Glu | Gly | Gly | Leu | Glu | Arg | Phe | Trp | Leu |
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| Ala | Val | Phe | Ala | Gly | Thr | Gly | Ala | Arg | Arg | Val | Asp | Leu | Pro | Thr |
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| Tyr | Ala | Phe | Gln | Ser | Gln | Arg | Phe | Trp | Pro | Glu | Ala | Ala | Pro | Ile |
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| Trp | Glu | Ala | Val | Glu | Arg | Glu | Asp | Leu | Glu | Ala | Leu | Thr | Ala | Glu |
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| Leu | Asp | Ile | Glu | Gly | Asp | Gln | Pro | Leu | Thr | Ala | Leu | Leu | Pro | Ala |
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| Leu | Ser | Ser | Trp | Arg | Arg | Gln | Ser | Arg | Glu | His | Ser | Thr | Val | Asp |
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| Thr | Ser | Arg | Leu | Ser | Gly | Thr | Trp | Leu | Val | Val | Val | Pro | Glu | Asn |
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| Pro | Gly | Tyr | Thr | Ala | Val | Arg | Pro | Ser | Pro | Phe | Leu | Gly | Asp | Leu |
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| Pro | Glu | Val | Arg | Gln | Leu | Ala | Ala | Ser | Ala | Pro | Ala | Ala | Gly | Glu |
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| Ala | Gly | Gly | Asp | Ser | Pro | Ala | Glu | Ala | Leu | Arg | Arg | Arg | Leu | Ala |
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| Val | Met | Pro | Gln | Ala | Glu | Gln | Ala | Leu | Ala | Val | Leu | Glu | Leu | Val |
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| Arg | Ser | His | Ala | Ala | Thr | Ala | Leu | Gly | His | Pro | Thr | Thr | Asp | Glu |
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| Val | Gly | Ala | Gly | Arg | Ala | Phe | Lys | Glu | Leu | Gly | Phe | Asp | Ser | Leu |
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| Ile | Ala | Leu | Glu | Leu | Arg | Asn | Arg | Leu | Asn | Ala | Ala | Thr | Gly | Leu |
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| Arg | Leu | Pro | Ala | Thr | Leu | Val | Phe | Asp | His | Pro | Thr | Pro | Thr | Ile |
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| Leu | Ala | Glu | Phe | Leu | Arg | Ala | Glu | Ile | Thr | Gln | Asp | Gly | Ser | Ala |
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| Gly | Ala | Ala | Pro | Gly | Ile | Thr | Glu | Leu | Glu | Lys | Leu | Glu | Ser | Ala |
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| Leu | Ser | Val | Leu | Asp | Pro | Asp | Ser | Glu | Thr | Arg | Thr | Asp | Ile | Ala |
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| Leu | Arg | Leu | Gln | Ala | Leu | Leu | Ala | Lys | Trp | Gly | Glu | Pro | His | Ile |
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| Glu | Ser | Ser | Gly | Glu | Ala | Val | Thr | Glu | Lys | Leu | Gln | Glu | Ala | Thr |
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 Arg Phe Pro Gly Gly Ile Glu Ser Pro Glu Gly Leu Trp Asp Leu Val
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 Ala Gly Gly Arg Asp Ala Ile Thr Asp Phe Pro Thr Asp Arg Gly Trp
 65 70 75 80
 Asp Ile Glu Ser Leu Tyr Asp Ala Asp Pro Asp Gln Gln Gly Thr Ser
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 Tyr Thr Arg Glu Gly Gly Phe Leu Asp Gly Val Gly Lys Phe Asp Ala
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 Ser Phe Phe Gly Ile Ser Pro Arg Glu Thr Leu Gly Met Asp Pro Gln

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| Ile | Asp | Ala | Ala | Thr | Leu | Arg | Gly | Ser | Lys | Ala | Gly | Val | Phe | Ile | Gly |
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| Val | Ser | Asn | Leu | Thr | Gly | Ala | Ser | Val | Thr | Ala | Glu | Glu | Ile | Cys | Ala |
| | | | 820 | | | | | 825 | | | | | 830 | | |
| Ala | Asp | Tyr | Trp | Val | Arg | His | Val | Arg | Glu | Ala | Val | Arg | Phe | Leu | Asp |
| | | 835 | | | | | 840 | | | | | 845 | | | |
| Gly | Val | Arg | Lys | Leu | Ser | Ala | Gln | Gly | Val | Thr | Thr | Phe | Val | Glu | Val |
| | 850 | | | | | 855 | | | | | 860 | | | | |
| Gly | Pro | Gly | Gly | Val | Leu | Thr | Ala | Leu | Ala | Gln | Glu | Cys | Val | Thr | Gly |
| 865 | | | | | 870 | | | | | 875 | | | | | 880 |
| Gln | Asp | Ala | Val | Phe | Val | Pro | Val | Leu | Arg | Gly | Asp | Arg | Pro | Glu | Ala |
| | | | 885 | | | | | | 890 | | | | | 895 | |
| Ala | Ala | Phe | Ala | Thr | Ala | Val | Ala | Gln | Ala | His | Val | His | Gly | Val | Ala |
| | | | 900 | | | | | 905 | | | | | 910 | | |
| Val | Asp | Trp | Ser | Ala | Val | Phe | Ala | Gly | Arg | Gly | Ala | Thr | Arg | Ile | Asp |
| | | 915 | | | | | 920 | | | | | 925 | | | |
| Leu | Pro | Thr | Tyr | Ala | Phe | Gln | Arg | Glu | Leu | Tyr | Trp | Pro | Glu | Gln | Pro |
| | 930 | | | | | 935 | | | | | 940 | | | | |
| Thr | Ala | Trp | Ala | Gly | Asp | Val | Thr | Ala | Ala | Gly | Ile | Gly | Ala | Ala | Asp |
| 945 | | | | | 950 | | | | | 955 | | | | | 960 |
| His | Pro | Leu | Leu | Gly | Ala | Ala | Ile | Ala | Leu | Ala | Asp | Gly | Asp | Gly | His |
| | | | 965 | | | | | 970 | | | | | 975 | | |
| Leu | Phe | Thr | Gly | Arg | Leu | Ser | Leu | Ala | Thr | His | Pro | Trp | Leu | Ala | Asp |
| | | 980 | | | | | | 985 | | | | | 990 | | |
| His | Thr | Val | Met | Asp | Thr | Val | Leu | Leu | Pro | Gly | Thr | Ala | Phe | Val | Glu |
| | | 995 | | | | | 1000 | | | | | 1005 | | | |
| Leu | Ala | Leu | Gln | Ala | Gly | Asp | His | Thr | Gly | Cys | Asp | Leu | Leu | Asp | |
| | 1010 | | | | | 1015 | | | | | 1020 | | | | |
| Glu | Leu | Thr | Leu | Glu | Ala | Pro | Leu | Val | Leu | Pro | Pro | His | Gly | Gly | |
| | 1025 | | | | | 1030 | | | | | 1035 | | | | |
| Val | Gln | Ile | Gln | Leu | Ala | Val | Gly | Ala | Pro | Asp | Ala | Glu | Gly | Arg | |
| | 1040 | | | | | 1045 | | | | | 1050 | | | | |
| Arg | Ser | Leu | Thr | Leu | His | Ser | Arg | Pro | Glu | Asp | Ala | Ala | Asp | Asp | |
| | 1055 | | | | | 1060 | | | | | 1065 | | | | |
| Thr | Trp | Gly | Glu | Gly | Ala | Trp | Thr | Arg | His | Ala | Thr | Gly | Phe | Leu | |

| 1070 | 1075 | 1080 |
|---------------------------------|-----------------------------|-------------------------|
| Ala Thr Ala Ala Gln Gly 1085 | Ala Arg Glu Pro Leu 1090 | Ala Asp Leu Thr 1095 |
| Ser Trp Pro Pro Lys Asn 1100 | Ala Thr Lys Val Asp 1105 | Val Glu Gly Leu 1110 |
| Tyr Ala Tyr Leu Thr Glu 1115 | Ser Gly Phe Ala Tyr 1120 | Gly Pro Val Phe 1125 |
| Gln Gly Leu Thr Gly Ala 1130 | Trp Gln Arg Gly Asp 1135 | Glu Val Phe Ala 1140 |
| Glu Val Arg Leu Pro Glu 1145 | Gln Ala His Ala Glu 1150 | Ala Ala Leu Phe 1155 |
| Gly Leu His Pro Ala Leu 1160 | Leu Asp Ala Ala Leu 1165 | His Ala Val Gly 1170 |
| Ile Gly Ser Leu Leu Glu 1175 | Asp Thr Glu His Gly 1180 | Arg Leu Pro Phe 1185 |
| Ser Trp Ser Gly Val Ser 1190 | Leu Arg Ala Val Gly 1195 | Ala Arg Ala Leu 1200 |
| Arg Val Arg Leu Ala Pro 1205 | Ala Gly Asn Asp Thr 1210 | Val Ser Val Thr 1215 |
| Leu Ala Asp Glu Thr Gly 1220 | Ala Pro Val Ala Ala 1225 | Val Asp Ala Leu 1230 |
| Leu Leu Arg Pro Val Ser 1235 | Pro Asp Gln Val His 1240 | Ala Ala Arg Thr 1245 |
| Ala Phe His Asp Ser Leu 1250 | Phe Arg Val Glu Trp 1255 | Thr Gly Thr Pro 1260 |
| Leu Pro Ala Ala Thr Thr 1265 | Val Ala Ala Gly Gln 1270 | Trp Ala Leu Leu 1275 |
| Gly Glu Pro Arg Thr Glu 1280 | Phe Thr Ala Ala Leu 1285 | Pro Thr Ala Ala 1290 |
| Thr His Ala Asp Leu Ala 1295 | Ala Leu Gly Ala Ala 1300 | Leu Asp Ala Gly 1305 |
| Gly Pro Val Pro Arg Ala 1310 | Val Ile Val Pro Phe 1315 | Ser Ala Ser Gly 1320 |
| Ala Pro Ser Ala Thr Pro 1325 | Val Asp Ala Ala Leu 1330 | Pro Thr Ala Val 1335 |
| Ala Asp Ala Leu His Arg 1340 | Thr Leu Glu Leu Ala 1345 | Gln Ala Trp Leu 1350 |
| Ala Asp Asp Arg Phe Ala 1355 | Gly Ser Arg Leu Val 1360 | Phe Val Thr Arg 1365 |
| Asp Ala Val Ala Thr Thr 1370 | Ala Gly Ser Asp Val 1375 | Ala Asp Leu Ala 1380 |

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|-----------------------------|-------------------------------------|------|--|------|
| 1370 | | 1375 | | 1380 |
| His Ala Pro Leu Trp Gly Leu | Leu Arg Ser Ala Gln Ser Glu His | | | |
| 1385 | 1390 | 1395 | | |
| Pro Asp Arg Phe Val Leu | Leu Asp Leu Asp Gly Arg Glu Asp Ser | | | |
| 1400 | 1405 | 1410 | | |
| Leu Arg Ala Leu Pro Ala | Ala Leu Ala Thr Ala Glu Pro Gln Leu | | | |
| 1415 | 1420 | 1425 | | |
| Ala Leu Arg Ala Gly Lys | Ala Leu Val Pro Arg Leu Ala Arg Val | | | |
| 1430 | 1435 | 1440 | | |
| Ala Ala Ala Pro Gly Gln | Glu Ala Pro Ala Leu Asp Pro Asp Gly | | | |
| 1445 | 1450 | 1455 | | |
| Thr Ala Leu Val Thr Gly | Ala Thr Gly Thr Leu Gly Gly Leu Val | | | |
| 1460 | 1465 | 1470 | | |
| Ala Arg His Leu Val Ala | Ala His Gly Val Arg His Leu Leu Leu | | | |
| 1475 | 1480 | 1485 | | |
| Thr Ser Arg Arg Gly Glu | Ala Ala Gly Ala Ala Glu Leu Ala | | | |
| 1490 | 1495 | 1500 | | |
| Ala Gly Leu Arg Glu Leu | Gly Ala Glu Val Thr Ile Ala Ala Cys | | | |
| 1505 | 1510 | 1515 | | |
| Asp Ala Ala Asp Arg Asp | Ala Leu Ala Ala Leu Ile Gly Ser Val | | | |
| 1520 | 1525 | 1530 | | |
| Pro Ala Glu His Pro Leu | Thr Ala Val Val His Thr Ala Gly Val | | | |
| 1535 | 1540 | 1545 | | |
| Leu Asp Asp Gly Val Leu | Glu Ala Leu Thr Pro Glu Arg Ile Asp | | | |
| 1550 | 1555 | 1560 | | |
| Ala Val Leu Pro Ala Lys | Val Asp Ala Ala Val His Leu His Glu | | | |
| 1565 | 1570 | 1575 | | |
| Leu Thr Arg Glu Leu Asp | Leu Ala Ala Phe Val Leu Phe Ser Ala | | | |
| 1580 | 1585 | 1590 | | |
| Ala Ala Gly Thr Leu Gly | Gly Pro Gly Gln Ala Asn Tyr Ala Ala | | | |
| 1595 | 1600 | 1605 | | |
| Ala Asn Thr Phe Leu Asp | Ala Leu Ala His Arg Arg Arg Ala Glu | | | |
| 1610 | 1615 | 1620 | | |
| Gly Leu Pro Ala Thr Ala | Leu Ala Trp Gly Leu Trp Ala Glu Arg | | | |
| 1625 | 1630 | 1635 | | |
| Ser Gly Met Thr Gly Asp | Leu Ala Asp Ala Asp Leu Glu Arg Ile | | | |
| 1640 | 1645 | 1650 | | |
| Ser Arg Ala Gly Val Ala | Ala Leu Ser Ser Ala Glu Gly Leu Ala | | | |
| 1655 | 1660 | 1665 | | |
| Leu Leu Asp Thr Ala Arg | Ala Val Gly Asp Pro Thr Ala Val Pro | | | |

| | | | | |
|-----------------------------|---------------------|-------------|--|------|
| 1670 | | 1675 | | 1680 |
| Met His Leu Asp Leu Ala Ser | Leu Arg His Ala Asp | Ala Ser Met | | |
| 1685 | 1690 | 1695 | | |
| Val Pro Ala Leu Leu Arg Gly | Leu Val Arg Ala Pro | Ala Arg Arg | | |
| 1700 | 1705 | 1710 | | |
| Ser Val Glu Ser Pro Gly Ala | Ala Pro Ala Gly Gly | Leu Ala Glu | | |
| 1715 | 1720 | 1725 | | |
| Arg Leu Leu Pro Leu Thr Ala | Ala Glu Arg Asp Arg | Leu Leu Leu | | |
| 1730 | 1735 | 1740 | | |
| Asp Thr Val Arg Val Gln Val | Ala Ala Val Leu Gly | Tyr Pro Gly | | |
| 1745 | 1750 | 1755 | | |
| Pro Glu Ala Val Asp Pro Gly | Arg Ala Phe Lys Glu | Leu Gly Phe | | |
| 1760 | 1765 | 1770 | | |
| Asp Ser Leu Thr Ala Val Glu | Leu Arg Asn Arg Leu | Gly Ser Ala | | |
| 1775 | 1780 | 1785 | | |
| Thr Gly Val Arg Leu Pro Ala | Thr Leu Val Phe Asp | Tyr Pro Thr | | |
| 1790 | 1795 | 1800 | | |
| Pro Asn Ala Leu Ser Ala Phe | Leu Arg Thr Glu Leu | Leu Gly Asp | | |
| 1805 | 1810 | 1815 | | |
| Ala Ala Asp Ser Ala Pro Val | Ala Ala Val Thr Ala | Arg Asp Asp | | |
| 1820 | 1825 | 1830 | | |
| Glu Pro Ile Ala Ile Val Gly | Met Ser Cys Arg Tyr | Pro Gly Gly | | |
| 1835 | 1840 | 1845 | | |
| Val Thr Thr Pro Glu Glu Leu | Trp Gln Leu Val Ala | Gly Ser Val | | |
| 1850 | 1855 | 1860 | | |
| Asp Ala Ile Ser Pro Phe Pro | Thr Asp Arg Gly Trp | Asn Leu Asp | | |
| 1865 | 1870 | 1875 | | |
| Ala Leu Tyr Asp Ala Asp Pro | Gly Arg Ala Gly Thr | Ser Tyr Thr | | |
| 1880 | 1885 | 1890 | | |
| Arg Glu Gly Gly Phe Leu His | Asp Ala Ala Asp Phe | Asp Pro Asp | | |
| 1895 | 1900 | 1905 | | |
| Val Phe Gly Ile Asn Pro Arg | Glu Ala Leu Ala Met | Asp Pro His | | |
| 1910 | 1915 | 1920 | | |
| Gln Arg Leu Leu Leu Glu Thr | Ser Trp Glu Ala Phe | Glu Gln Ala | | |
| 1925 | 1930 | 1935 | | |
| Gly Ile Ala Pro Ser Ser Met | Arg Gly Ser Arg Thr | Gly Val Phe | | |
| 1940 | 1945 | 1950 | | |
| Ala Gly Val Met Tyr His Asp | Tyr Leu Thr Arg Leu | Pro Ala Val | | |
| 1955 | 1960 | 1965 | | |
| Pro Glu Gly Leu Glu Gly Tyr | Leu Gly Thr Gly Thr | Ala Gly Ser | | |

| 1970 | 1975 | 1980 |
|---------------------------------|-----------------------------|-------------------------|
| Val Ala Ser Gly Arg Ile 1985 | Ser Tyr Thr Phe Gly 1990 | Leu Glu Gly Pro 1995 |
| Ala Val Thr Val Asp Thr 2000 | Ala Cys Ser Ser Ser 2005 | Leu Val Ala Leu 2010 |
| His Leu Ala Ala Gln Ala 2015 | Leu Arg Asn Gly Glu 2020 | Cys Asp Met Ala 2025 |
| Leu Ala Gly Gly Val Thr 2030 | Val Met Ser Thr Pro 2035 | Asp Thr Phe Ile 2040 |
| Asp Phe Ser Arg Gln Arg 2045 | Gly Leu Ser Gly Asn 2050 | Gly Arg Cys Lys 2055 |
| Ser Phe Ser Ala Asp Ala 2060 | Asp Gly Thr Gly Trp 2065 | Ala Glu Gly Ala 2070 |
| Gly Met Ile Leu Val Glu 2075 | Arg Leu Ser Asp Ala 2080 | Arg Arg Asn Gly 2085 |
| His Gln Val Leu Ala Val 2090 | Val Arg Gly Thr Ala 2095 | Val Asn Gln Asp 2100 |
| Gly Ala Ser Asn Gly Leu 2105 | Thr Ala Pro Asn Gly 2110 | Pro Ser Gln Gln 2115 |
| Arg Val Ile Arg Gln Ala 2120 | Leu Ala Asn Ala Gly 2125 | Leu Thr Thr Ala 2130 |
| Glu Val Asp Val Val Glu 2135 | Ala His Gly Thr Gly 2140 | Thr Thr Leu Gly 2145 |
| Asp Pro Ile Glu Ala Gln 2150 | Ala Leu Leu Ala Thr 2155 | Tyr Gly Gln Asp 2160 |
| Arg Pro Ala Gly Gln Pro 2165 | Leu Arg Leu Gly Ser 2170 | Ile Lys Ser Asn 2175 |
| Ile Gly His Thr Gln Ala 2180 | Ala Ala Gly Ala Ala 2185 | Gly Ile Ile Lys 2190 |
| Met Ile Leu Ala Met Arg 2195 | His Gly Val Met Pro 2200 | Pro Ser Leu His 2205 |
| Ile Gly Glu Pro Ser Pro 2210 | His Ile Asp Trp Thr 2215 | Ala Gly Ala Val 2220 |
| Ser Leu Leu Thr Glu Ala 2225 | Ala Glu Trp Pro Asp 2230 | Ala Gly Arg Pro 2235 |
| Arg Arg Ala Gly Ile Ser 2240 | Ser Phe Gly Val Ser 2245 | Gly Thr Asn Ala 2250 |
| His Val Ile Ile Glu Gln 2255 | Pro Pro Val Glu Glu 2260 | Pro Ala Thr Ala 2265 |
| Thr Glu Thr Gly Ser Gly 2270 | Thr Gly Leu Pro Ala 2275 | Gly Thr Pro Leu 2280 |

| | | |
|---|------|------|
| 2270 | 2275 | 2280 |
| Pro Phe Ala Leu Ser Gly Arg Thr Pro Ala Ala Leu Arg Ala Gln 2285 2290 2295 | | |
| Ala Ala Arg Leu Ile Gly His Leu Ala Pro Arg Pro Glu Ala Ala 2300 2305 2310 | | |
| Pro Ala Asp Val Ala Leu Ser Leu Ala Thr Thr Arg Thr Ala Leu 2315 2320 2325 | | |
| Asp Arg Arg Ala Ala Val Ile Ala His Asp Arg Thr Glu Leu Leu 2330 2335 2340 | | |
| Ala Gly Leu Thr Ala Leu Ala Glu Gly His Asp Ser Ala Arg Leu 2345 2350 2355 | | |
| Val Gln His Thr Ala Ala Asp Gly Arg Thr Ala Ile Leu Phe Thr 2360 2365 2370 | | |
| Gly Gln Gly Ser Gln Arg Pro Gly Met Gly Arg Glu Leu Tyr Glu 2375 2380 2385 | | |
| Thr Tyr Pro Ala Phe Ala Glu Ala Leu Asp Ala Val Cys Ala Glu 2390 2395 2400 | | |
| Leu Asp Pro His Leu Glu Gln Pro Leu Lys Glu Val Leu Phe Thr 2405 2410 2415 | | |
| Ala Asp Gly Asp Leu Leu Asn Arg Thr Gly Arg Thr Gln Pro Ala 2420 2425 2430 | | |
| Leu Phe Ala Leu Glu Thr Ala Leu Tyr Arg Leu Val Glu Ser Trp 2435 2440 2445 | | |
| Gly Val Arg Pro Asp Phe Val Ala Gly His Ser Ile Gly Glu Ile 2450 2455 2460 | | |
| Thr Ala Ala His Val Ala Gly Val Leu Ser Leu Pro Asp Ala Ala 2465 2470 2475 | | |
| Thr Leu Val Ala Ala Arg Gly Arg Leu Met Gln Glu Leu Pro Glu 2480 2485 2490 | | |
| Gly Gly Ala Met Ile Ala Leu Thr Ala Thr Glu Asp Glu Val Leu 2495 2500 2505 | | |
| Pro Leu Leu Ala Gly His Glu Asp Arg Ile Gly Ile Ala Ala Val 2510 2515 2520 | | |
| Asn Ser Ala Ser Ser Val Val Ile Ser Gly Glu Glu Gly Leu Ala 2525 2530 2535 | | |
| Leu Glu Ile Ala Ala Glu Phe Glu Arg Arg Gly Arg Arg Thr Lys 2540 2545 2550 | | |
| Arg Leu Thr Val Ser His Ala Phe His Ser Pro Leu Met Asp Gly 2555 2560 2565 | | |
| Met Leu Asp Ala Phe Arg Glu Val Ala Glu Ser Leu Thr Tyr Arg | | |

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|-------------------------|---------------------|-----------------|
| 2570 | 2575 | 2580 |
| Ala Pro Ala Ile Pro Val | Val Thr Leu Leu Thr | Gly Thr Val Ala |
| 2585 | 2590 | 2595 |
| Gly Asp Glu Leu Arg Thr | Ala Glu His Trp Val | Ser His Val Arg |
| 2600 | 2605 | 2610 |
| Glu Ala Val Arg Phe Leu | Asp Gly Ile Arg Thr | Leu Asp Ala Glu |
| 2615 | 2620 | 2625 |
| His Val Thr Thr Tyr Leu | Glu Leu Gly Pro Gln | Gly Val Leu Ser |
| 2630 | 2635 | 2640 |
| Gly Leu Gly Arg Asp Cys | Leu Thr Asp Pro Ala | Asp Pro Ala Asp |
| 2645 | 2650 | 2655 |
| Thr Ala Val Phe Val Pro | Ala Leu Arg Arg Asp | Arg Gly Glu Ala |
| 2660 | 2665 | 2670 |
| Glu Ala Leu Thr Ala Ala | Ile Ala Ala Ala His | Thr Arg Gly Val |
| 2675 | 2680 | 2685 |
| Pro Leu Asp Trp Ser Ala | Tyr Phe Ala Gly Thr | Gly Ala Arg Arg |
| 2690 | 2695 | 2700 |
| Val Glu Leu Pro Thr Tyr | Ala Phe Gln Arg Glu | Arg Phe Trp Leu |
| 2705 | 2710 | 2715 |
| Glu Ala Pro Ala Gly Tyr | Ile Gly Asp Val Glu | Ser Ala Gly Met |
| 2720 | 2725 | 2730 |
| Gly Ala Ala His His Pro | Leu Leu Gly Ala Ala | Val Ala Leu Ala |
| 2735 | 2740 | 2745 |
| Asp Gly Glu Gly Phe Leu | Phe Thr Gly Arg Leu | Ser Leu Asp Thr |
| 2750 | 2755 | 2760 |
| His Pro Trp Leu Ala Asp | His Ala Val Met Gly | Asn Val Leu Leu |
| 2765 | 2770 | 2775 |
| Pro Gly Thr Ala Phe Val | Glu Leu Ala Ile Arg | Ala Gly Asp Gln |
| 2780 | 2785 | 2790 |
| Ala Gly Cys Asp Leu Leu | Glu Glu Leu Thr Leu | Glu Ala Pro Leu |
| 2795 | 2800 | 2805 |
| Ile Leu Ala Pro Gln Ala | Ala Ala Arg Leu Gln | Ile Val Val Gly |
| 2810 | 2815 | 2820 |
| Ala Pro Asp Gly Ser Gly | Arg Arg Thr Leu Asp | Val Tyr Ser Ser |
| 2825 | 2830 | 2835 |
| Asp Pro Asp Ala Pro Ala | Asp Glu Pro Trp Thr | Arg His Ala Gly |
| 2840 | 2845 | 2850 |
| Gly Ile Leu Ala Thr Gly | Ala Gln Ala Pro Ala | Phe Asp Leu Thr |
| 2855 | 2860 | 2865 |
| Ala Trp Pro Pro Pro Gly | Ala Glu Ala Val Gly | Val Asp Gly Leu |

| 2870 | | | | | 2875 | | | | | 2880 | | | | |
|------|------|-----|-----|-----|------|------|------|-----|-----|------|------|-----|-----|-----|
| Tyr | Glu | His | Leu | Gly | Arg | Gly | Gly | Phe | Ala | Tyr | Gly | Pro | Val | Phe |
| | 2885 | | | | | | 2890 | | | | 2895 | | | |
| Gln | Gly | Leu | Arg | Ala | Ala | Trp | Leu | Leu | Gly | Asp | Asp | Val | Tyr | Ala |
| | 2900 | | | | | 2905 | | | | | 2910 | | | |
| Glu | Val | Ala | Leu | Pro | Asp | Asp | Arg | Gln | Ala | Glu | Ala | Ala | Arg | Phe |
| | 2915 | | | | | 2920 | | | | | 2925 | | | |
| Gly | Leu | His | Pro | Ala | Leu | Leu | Asp | Ala | Ala | Leu | His | Ala | Thr | Phe |
| | 2930 | | | | | 2935 | | | | | 2940 | | | |
| Val | Gln | Pro | Ser | Pro | Asp | Gly | Asp | Gln | Gln | Gly | Arg | Leu | Pro | Phe |
| | 2945 | | | | | 2950 | | | | | 2955 | | | |
| Ser | Trp | Arg | Asp | Val | Ser | Leu | His | Ala | Val | Gly | Ala | Ser | Ala | Leu |
| | 2960 | | | | | 2965 | | | | | 2970 | | | |
| Arg | Val | Arg | Leu | Thr | Pro | Asp | Gly | Arg | Asp | Thr | Leu | Ser | Leu | Gln |
| | 2975 | | | | | 2980 | | | | | 2985 | | | |
| Leu | Ala | Asp | Thr | Thr | Gly | Ala | Pro | Val | Ala | Ala | Val | Gly | His | Leu |
| | 2990 | | | | | 2995 | | | | | 3000 | | | |
| Thr | Leu | Arg | Pro | Val | Ser | Ala | Asp | Gln | Leu | Gly | Ser | Ala | Arg | Ser |
| | 3005 | | | | | 3010 | | | | | 3015 | | | |
| Ala | His | His | Glu | Ser | Leu | Phe | Arg | Ile | Asp | Trp | Ala | Thr | Val | Pro |
| | 3020 | | | | | 3025 | | | | | 3030 | | | |
| Leu | Pro | Ser | Asp | Ala | Pro | Ala | Ala | Thr | Asp | Glu | Trp | Ala | Val | Ile |
| | 3035 | | | | | 3040 | | | | | 3045 | | | |
| Ala | Ala | Asp | Gly | Gly | Thr | Asp | Gly | Gly | Thr | Asp | Gly | Gly | Thr | Asp |
| | 3050 | | | | | 3055 | | | | | 3060 | | | |
| Gly | Gly | Ile | Pro | Ala | Ala | Leu | Pro | Gly | Arg | Val | His | Thr | Gly | Leu |
| | 3065 | | | | | 3070 | | | | | 3075 | | | |
| Asp | Ala | Leu | Gly | Ala | Ala | Val | Asp | Ala | Gly | Ala | Pro | Val | Pro | Ala |
| | 3080 | | | | | 3085 | | | | | 3090 | | | |
| His | Val | Leu | Val | His | His | Thr | Pro | Ala | Ala | Thr | Thr | Ala | Asp | Ala |
| | 3095 | | | | | 3100 | | | | | 3105 | | | |
| Val | His | Ala | Ala | Thr | His | Glu | Ala | Leu | Arg | Leu | Val | Arg | Ala | Trp |
| | 3110 | | | | | 3115 | | | | | 3120 | | | |
| Leu | Ala | Asp | Asp | Arg | Phe | Ala | Ala | Ser | Arg | Leu | Val | Phe | Val | Thr |
| | 3125 | | | | | 3130 | | | | | 3135 | | | |
| Arg | Gly | Ala | Ile | Ala | Thr | Gln | Ser | Asp | Trp | Asp | Leu | Thr | Asp | Leu |
| | 3140 | | | | | 3145 | | | | | 3150 | | | |
| Thr | His | Ala | Pro | Val | Trp | Gly | Leu | Val | Arg | Thr | Ala | Gln | Ser | Glu |
| | 3155 | | | | | 3160 | | | | | 3165 | | | |
| Asn | Pro | Asp | Arg | Phe | Val | Leu | Ala | Asp | Leu | Asp | Ala | Asp | Pro | Ala |

| | | |
|-------------------------|---------------------|-----------------|
| 3170 | 3175 | 3180 |
| Ser Thr Asp Ala Leu Ala | Ala Ala Leu Ala Thr | Gly Glu Pro Gln |
| 3185 | 3190 | 3195 |
| Leu Ala Val Arg Arg Gly | Thr Val His Ala Pro | Arg Leu Ala Arg |
| 3200 | 3205 | 3210 |
| Val Pro Ala Ala Thr Pro | Leu Thr Pro Pro Pro | Gly Glu Ser Ala |
| 3215 | 3220 | 3225 |
| Trp Arg Met Asp Ile Glu | Asp Lys Gly Thr Leu | Asp His Leu Thr |
| 3230 | 3235 | 3240 |
| Leu Val Pro Ser Pro Glu | Ser Ala Ala Pro Leu | Glu Pro Gly Gln |
| 3245 | 3250 | 3255 |
| Val Arg Val Ala Val Arg | Ala Ala Gly Leu Asn | Phe Arg Asp Val |
| 3260 | 3265 | 3270 |
| Leu Asn Ala Leu Gly Met | Tyr Pro Gly Asp Pro | Gly Leu Met Gly |
| 3275 | 3280 | 3285 |
| Ser Glu Gly Ala Gly Ile | Val Val Glu Thr Gly | Pro Gly Val Thr |
| 3290 | 3295 | 3300 |
| Gly Leu Ala Pro Gly Asp | Arg Val Met Gly Met | Leu Pro Gly Ser |
| 3305 | 3310 | 3315 |
| Phe Gly Pro Leu Ala Val | Val Asp Arg Arg Met | Ile Ala Pro Met |
| 3320 | 3325 | 3330 |
| Pro Glu Gly Trp Thr Phe | Ala Glu Ala Ala Ser | Val Pro Ile Val |
| 3335 | 3340 | 3345 |
| Phe Met Thr Ala Tyr Tyr | Ala Leu His Asp Leu | Ala Gly Leu Gln |
| 3350 | 3355 | 3360 |
| Gly Gly Glu Ser Leu Leu | Val His Ala Ala Ala | Gly Gly Val Gly |
| 3365 | 3370 | 3375 |
| Met Ala Ala Val Gln Leu | Ala Arg His Trp Gly | Ala Asp Val Tyr |
| 3380 | 3385 | 3390 |
| Ala Thr Ala Ser Pro Ala | Lys Trp Asp Thr Leu | Arg Gly Leu Gly |
| 3395 | 3400 | 3405 |
| Leu Gly Asp Asp Arg Ile | Ala Ser Ser Arg Thr | Leu Asp Phe Glu |
| 3410 | 3415 | 3420 |
| Glu Thr Phe Arg Thr Ala | Thr Gly Gly Arg Gly | Val Asp Val Val |
| 3425 | 3430 | 3435 |
| Leu Asp Ser Leu Ala Arg | Glu Phe Val Asp Ala | Ser Leu Arg Leu |
| 3440 | 3445 | 3450 |
| Leu Pro Arg Gly Gly Arg | Phe Val Glu Met Gly | Lys Thr Asp Val |
| 3455 | 3460 | 3465 |
| Arg Ser Pro Gln Asp Val | Ala Asp Ala His Pro | Gly Val Ser Tyr |

| | | | | |
|-------------------------|---------------------|-----------------|--|------|
| 3470 | | 3475 | | 3480 |
| Gln Ala Phe Asp Leu Thr | Glu Ala Gly Leu Asp | Arg Ile Gln Glu | | |
| 3485 | 3490 | 3495 | | |
| Met Leu Thr Glu Leu Leu | Thr Leu Phe Arg Ser | Gly Ala Leu Arg | | |
| 3500 | 3505 | 3510 | | |
| Pro Val Pro Val Ser Ala | Trp Asp Leu Arg Gln | Ala Pro Glu Ala | | |
| 3515 | 3520 | 3525 | | |
| Phe Arg Tyr Leu Ser Gln | Ala Arg His Val Gly | Lys Ile Val Leu | | |
| 3530 | 3535 | 3540 | | |
| Thr Leu Pro Gly Glu Trp | Asn Ser Gln Gly Thr | Val Leu Ile Thr | | |
| 3545 | 3550 | 3555 | | |
| Gly Gly Thr Gly Thr Leu | Gly Ala Val Val Ala | Arg His Ala Val | | |
| 3560 | 3565 | 3570 | | |
| Thr Thr Arg Gly Ala Arg | Arg Leu Leu Leu Thr | Ser Arg Arg Gly | | |
| 3575 | 3580 | 3585 | | |
| Glu Ala Ala Ala Gly Ala | Ala Glu Leu Ala Ala | Glu Leu Arg Glu | | |
| 3590 | 3595 | 3600 | | |
| Leu Gly Ala Glu Val Thr | Ile Ala Ala Cys Asp | Ala Ala Asp Arg | | |
| 3605 | 3610 | 3615 | | |
| Asp Ala Leu Ala Ala Leu | Ile Glu Ser Ile Pro | Ser Glu His Pro | | |
| 3620 | 3625 | 3630 | | |
| Leu Thr Ala Val Ile His | Thr Ala Gly Val Leu | Asp Asp Gly Val | | |
| 3635 | 3640 | 3645 | | |
| Val Asp Ser Leu Thr Pro | Glu Arg Leu Ser Thr | Val Leu Arg Pro | | |
| 3650 | 3655 | 3660 | | |
| Lys Val Asp Ala Ala Trp | Asn Leu His Glu Leu | Thr Arg His Leu | | |
| 3665 | 3670 | 3675 | | |
| Asp Leu Ala Asp Phe Val | Leu Phe Ser Ser Ala | Ala Gly Thr Phe | | |
| 3680 | 3685 | 3690 | | |
| Gly Gly Ala Gly Gln Ala | Asn Tyr Ala Ala Ala | Asn Val Phe Leu | | |
| 3695 | 3700 | 3705 | | |
| Asp Ala Leu Ala Arg His | Arg His Ala His Gly | Leu Ala Ala Thr | | |
| 3710 | 3715 | 3720 | | |
| Ser Leu Ala Trp Gly Leu | Trp Ala Glu Ala Ser | Gly Met Thr Gly | | |
| 3725 | 3730 | 3735 | | |
| Glu Leu Asp Thr Ala Asp | Lys Asp Arg Met Thr | Arg Ser Gly Val | | |
| 3740 | 3745 | 3750 | | |
| Leu Gly Leu Ser Ser Glu | Glu Gly Val Ala Leu | Leu Asp Thr Ala | | |
| 3755 | 3760 | 3765 | | |
| Arg Leu Thr Gly Asp Ala | Leu Leu Val Pro Met | His Leu Asp Leu | | |

| | | |
|-------------------------------------|-----------------------------|---------------------|
| 3770 | 3775 | 3780 |
| Ala Pro Leu Arg Arg Thr Asp 3785 | Ala Ser Met Val Pro 3790 | Ala Leu Leu 3795 |
| Arg Gly Leu Val Arg Ala Pro 3800 | Ala Arg Arg Ala Val 3805 | Gly Ala Thr 3810 |
| Ala Ala Gly Ala Gly Thr Pro 3815 | Leu Val Glu Arg Leu 3820 | Val Arg Leu 3825 |
| Pro Glu Asn Glu Arg Asp Pro 3830 | Leu Leu Leu Asp Leu 3835 | Val Arg Gln 3840 |
| Gln Val Ala Ala Val Leu Gly 3845 | His Ala Thr Pro Asp 3850 | Ala Val Glu 3855 |
| Pro Thr Arg Ala Phe Lys Asp 3860 | Leu Gly Phe Asp Ser 3865 | Leu Thr Ala 3870 |
| Val Glu Phe Arg Asn Arg Leu 3875 | Gly Ala Thr Ala Gly 3880 | Ile Arg Leu 3885 |
| Pro Ala Thr Leu Val Phe Asp 3890 | Tyr Pro Thr Pro Thr 3895 | Val Leu Ala 3900 |
| Gly Tyr Leu Lys Asp Glu Leu 3905 | Leu Gly Ser Glu Ala 3910 | Ala Ala Ala 3915 |
| Leu Pro Lys Leu Ala Ala Thr 3920 | Ala Val Glu Gly Asp 3925 | Asp Pro Ile 3930 |
| Ala Ile Val Ala Met Ser Cys 3935 | Arg Phe Pro Gly Asp 3940 | Val Arg Thr 3945 |
| Pro Glu Asp Leu Trp Glu Leu 3950 | Leu Ala Glu Gly Arg 3955 | Asp Gly Ile 3960 |
| Ser Asp Leu Pro Asp Asp Arg 3965 | Gly Trp Asp Thr Glu 3970 | Ala Leu Tyr 3975 |
| Asp Pro Asp Pro Asp Ser Pro 3980 | Gly Thr Ser Tyr Ala 3985 | Arg Glu Gly 3990 |
| Gly Phe Phe Tyr Asp Ala His 3995 | His Phe Asp Pro Ala 4000 | Phe Phe Gly 4005 |
| Ile Asn Pro Arg Glu Ala Leu 4010 | Ala Met Asp Pro Gln 4015 | Gln Arg Leu 4020 |
| Leu Leu Glu Thr Ser Trp Glu 4025 | Ala Phe Glu Arg Ala 4030 | Gly Ile Asp 4035 |
| Pro Thr Gly Leu Arg Gly Lys 4040 | Gln Val Gly Val Phe 4045 | Val Gly Gln 4050 |
| Met His Asn Asp Tyr Val Ser 4055 | Arg Leu Asn Thr Val 4060 | Pro Glu Gly 4065 |
| Val Glu Gly Tyr Leu Gly Thr 4070 | Gly Gly Ser Ser Ser 4075 | Ile Ala Ser 4080 |

| 4070 | | | | | | 4075 | | | | 4080 | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|-----|
| Gly | Arg | Val | Ser | Tyr | Thr | Phe | Asp | Phe | Glu | Gly | Pro | Ala | Val | Thr |
| 4085 | | | | | | 4090 | | | | 4095 | | | | |
| Val | Asp | Thr | Ala | Cys | Ser | Ser | Ser | Leu | Val | Ala | Leu | His | Leu | Ala |
| 4100 | | | | | | 4105 | | | | 4110 | | | | |
| Ala | Gln | Ala | Leu | Arg | Asn | Gly | Glu | Cys | Thr | Leu | Ala | Leu | Ala | Gly |
| 4115 | | | | | | 4120 | | | | 4125 | | | | |
| Gly | Val | Thr | Ile | Ile | Thr | Thr | Pro | Asp | Val | Phe | Thr | Glu | Phe | Ser |
| 4130 | | | | | | 4135 | | | | 4140 | | | | |
| Arg | Gln | Arg | Gly | Leu | Ala | Ser | Asp | Gly | Arg | Cys | Lys | Pro | Phe | Ala |
| 4145 | | | | | | 4150 | | | | 4155 | | | | |
| Glu | Ala | Ala | Asp | Gly | Thr | Ala | Trp | Gly | Glu | Gly | Val | Gly | Met | Leu |
| 4160 | | | | | | 4165 | | | | 4170 | | | | |
| Leu | Val | Glu | Arg | Leu | Ser | Asp | Ala | Arg | Arg | Asn | Gly | His | Gln | Val |
| 4175 | | | | | | 4180 | | | | 4185 | | | | |
| Leu | Ala | Val | Val | Arg | Gly | Thr | Ala | Val | Asn | Gln | Asp | Gly | Ala | Ser |
| 4190 | | | | | | 4195 | | | | 4200 | | | | |
| Asn | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln | Arg | Val | Ile |
| 4205 | | | | | | 4210 | | | | 4215 | | | | |
| Arg | Gln | Ala | Leu | Ala | Asn | Ala | Gly | Leu | Thr | Ala | Ala | Glu | Val | Asp |
| 4220 | | | | | | 4225 | | | | 4230 | | | | |
| Ala | Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Arg | Leu | Gly | Asp | Pro | Ile |
| 4235 | | | | | | 4240 | | | | 4245 | | | | |
| Glu | Ala | Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Gln | Asp | Arg | Pro | Glu |
| 4250 | | | | | | 4255 | | | | 4260 | | | | |
| Gly | Ser | Pro | Leu | Trp | Leu | Gly | Ser | Ile | Lys | Ser | Asn | Phe | Gly | His |
| 4265 | | | | | | 4270 | | | | 4275 | | | | |
| Thr | Gln | Ala | Ala | Ala | Gly | Val | Ala | Gly | Ile | Ile | Lys | Met | Val | Gln |
| 4280 | | | | | | 4285 | | | | 4290 | | | | |
| Ala | Met | His | His | Gly | Val | Leu | Pro | Lys | Thr | Leu | His | Val | Asp | Ala |
| 4295 | | | | | | 4300 | | | | 4305 | | | | |
| Pro | Ser | Pro | His | Val | Asp | Trp | Ser | Ala | Gly | Ala | Val | Ser | Leu | Leu |
| 4310 | | | | | | 4315 | | | | 4320 | | | | |
| Thr | Glu | Gln | Met | Ala | Trp | Pro | Glu | Thr | Gly | Arg | Pro | Arg | Arg | Ala |
| 4325 | | | | | | 4330 | | | | 4335 | | | | |
| Gly | Val | Ser | Ser | Phe | Gly | Met | Ser | Gly | Thr | Asn | Ala | His | Ala | Ile |
| 4340 | | | | | | 4345 | | | | 4350 | | | | |
| Ile | Glu | Leu | Ala | Pro | Asp | Ala | Ala | Thr | Pro | Ser | Ala | Ala | Arg | Pro |
| 4355 | | | | | | 4360 | | | | 4365 | | | | |
| Glu | Pro | Ala | Pro | Ala | Ala | Leu | Pro | Trp | Asn | Leu | Ser | Ala | Arg | Thr |

| | | |
|-------------------------|---------------------|-----------------|
| 4370 | 4375 | 4380 |
| Pro Asp Ala Leu Arg Ala | Gln Gly Glu Arg Leu | Leu Ser His Leu |
| 4385 | 4390 | 4395 |
| Glu Thr His Cys Glu Thr | His Pro Glu Thr Val | Leu Ala Asp Ile |
| 4400 | 4405 | 4410 |
| Gly His Ser Leu Thr Thr | Gly Arg Ala Leu Phe | Glu His Arg Ala |
| 4415 | 4420 | 4425 |
| Thr Val Val Ala Gly Asp | Arg Asp Gly Phe Arg | Ala Gly Leu Ala |
| 4430 | 4435 | 4440 |
| Ala Leu Ala Glu Gly Arg | Thr Ala Ala Gly Leu | Ile Gln Gly Ser |
| 4445 | 4450 | 4455 |
| Ser Ser Thr Gly Gly Arg | Thr Ala Phe Leu Phe | Thr Gly Gln Gly |
| 4460 | 4465 | 4470 |
| Ser Gln Arg Leu Gly Met | Gly Arg Glu Leu Tyr | Glu Ala Tyr Pro |
| 4475 | 4480 | 4485 |
| Val Phe Ala Arg Ala Leu | Asp Glu Val Cys Ala | Arg Leu Glu Leu |
| 4490 | 4495 | 4500 |
| Pro Leu Pro Leu Lys Asp | Val Leu Phe Gly Thr | Asp Thr Gly Leu |
| 4505 | 4510 | 4515 |
| Leu Asn Glu Thr Ala Tyr | Thr Gln Pro Ala Leu | Phe Ala Val Glu |
| 4520 | 4525 | 4530 |
| Val Ala Leu Phe Arg Leu | Val Glu Ser Trp Gly | Leu Lys Pro Asp |
| 4535 | 4540 | 4545 |
| Phe Leu Ala Gly His Ser | Ile Gly Glu Ile Ala | Ala Ala His Val |
| 4550 | 4555 | 4560 |
| Ala Gly Val Leu Ser Leu | Glu Asp Ala Cys Ala | Leu Val Ser Ala |
| 4565 | 4570 | 4575 |
| Arg Gly Arg Leu Met Gly | Ala Leu Pro Gly Gly | Gly Val Met Ile |
| 4580 | 4585 | 4590 |
| Ala Val Gln Ala Ser Glu | Gly Glu Val Leu Pro | Leu Leu Thr Asp |
| 4595 | 4600 | 4605 |
| Arg Val Ser Ile Ala Ala | Ile Asn Gly Pro Gln | Ser Val Val Ile |
| 4610 | 4615 | 4620 |
| Ala Gly Asp Glu Ala Asp | Ala Val Ala Ile Val | Glu Ser Phe Ser |
| 4625 | 4630 | 4635 |
| Asp Arg Lys Ser Lys Arg | Leu Thr Val Ser His | Ala Phe His Ser |
| 4640 | 4645 | 4650 |
| Pro His Met Asp Gly Met | Leu Asp Asp Phe Arg | Ala Val Ala Glu |
| 4655 | 4660 | 4665 |
| Gly Leu Ser Tyr Gly Ala | Pro Arg Ile Pro Val | Val Ser Asn Leu |

| | | |
|---|------|------|
| 4670 | 4675 | 4680 |
| Thr Gly Ala Leu Val Ser Asp Glu Met Gly Ser Ala Asp Phe Trp 4685 4690 4695 | | |
| Val Arg His Val Arg Glu Ala Val Arg Phe Leu Asp Gly Ile Arg 4700 4705 4710 | | |
| Ala Leu Glu Ala Ala Gly Val Thr Thr Tyr Ile Glu Leu Gly Pro 4715 4720 4725 | | |
| Asp Gly Ile Leu Ser Ala Met Ala Gln Glu Cys Ile Thr Gly Glu 4730 4735 4740 | | |
| Gly Ala Ala Phe Ala Pro Val Leu Arg Ala Gly Arg Asp Glu Ala 4745 4750 4755 | | |
| Glu Thr Val Leu Ser Ala Leu Ala Ala Ala His Val Arg Gly Val 4760 4765 4770 | | |
| Pro Val Asp Trp Gln Ala Phe Tyr Ala Pro Ala Gly Ala Gln Arg 4775 4780 4785 | | |
| Val Pro Leu Pro Thr Tyr Ala Phe Gln Arg Ser Val Tyr Trp Leu 4790 4795 4800 | | |
| Asp Ala Gly Arg Ala Gln Gly Asp Ile Ala Ser Ala Gly Leu Gly 4805 4810 4815 | | |
| Ala Thr Asp His Pro Leu Leu Ser Ala Ala Val Glu Leu Pro Asp 4820 4825 4830 | | |
| Ser Asp Gly Phe Leu Phe Thr Gly Arg Leu Ser Leu Ala Thr His 4835 4840 4845 | | |
| Pro Trp Leu Ala Asp His Ala Val Leu Gly Ser Val Leu Leu Pro 4850 4855 4860 | | |
| Gly Thr Ala Phe Val Glu Leu Ala Leu Arg Ala Gly Asp Gln Val 4865 4870 4875 | | |
| Gly Cys Asp Leu Ile Asp Glu Leu Thr Leu Glu Ala Pro Leu Val 4880 4885 4890 | | |
| Leu Pro Pro His Gly Gly Val Gln Leu Arg Leu Ala Val Ala Ala 4895 4900 4905 | | |
| Ala Asp Ala Thr Gly Arg Arg Thr Leu Ala Phe His Ser Arg Ser 4910 4915 4920 | | |
| Glu Asp Ala Asp Ala Gly Thr Pro Trp Thr Arg His Ala Ser Gly 4925 4930 4935 | | |
| Val Leu Ala Val Gly Ala Glu Arg Thr Pro Gln Ser Leu Thr Glu 4940 4945 4950 | | |
| Trp Pro Pro Thr Gly Ala Glu Ser Val Pro Val Asp Gly Leu Tyr 4955 4960 4965 | | |
| Glu Gly Leu Ala Glu Ser Gly Phe Gly Tyr Gly Pro Val Phe Gln | | |

| 4970 | | | | | 4975 | | | | | 4980 | | | | |
|------|-----|-----|-----|-----|------|------|-----|-----|-----|------|------|-----|-----|-----|
| Gly | Leu | Arg | Ala | Ala | Trp | Arg | Arg | Asp | Gly | Glu | Tyr | Tyr | Ala | Glu |
| 4985 | | | | | | 4990 | | | | | 4995 | | | |
| Val | Ala | Leu | Pro | Glu | Gly | Thr | Glu | Asp | Glu | Ala | Gly | Arg | Phe | Gly |
| 5000 | | | | | | 5005 | | | | | 5010 | | | |
| Leu | His | Pro | Ala | Leu | Leu | Asp | Ala | Ala | Leu | His | Ala | Leu | Gly | Leu |
| 5015 | | | | | | 5020 | | | | | 5025 | | | |
| Gly | Ser | Thr | Asp | Thr | Glu | Gly | Gly | Glu | Gly | Arg | Leu | Pro | Phe | Ser |
| 5030 | | | | | | 5035 | | | | | 5040 | | | |
| Trp | Ser | Gly | Val | His | Leu | His | Ala | Val | Gly | Ala | Ser | Ala | Leu | Arg |
| 5045 | | | | | | 5050 | | | | | 5055 | | | |
| Val | Arg | Leu | Thr | Thr | Ser | Arg | Ser | Gly | Glu | Val | Ala | Leu | Thr | Ile |
| 5060 | | | | | | 5065 | | | | | 5070 | | | |
| Ala | Asp | Ala | Ala | Gly | Glu | Pro | Val | Ala | Thr | Val | Ala | Gly | Leu | Ala |
| 5075 | | | | | | 5080 | | | | | 5085 | | | |
| Leu | Arg | Ala | Val | Ser | Arg | Glu | Gln | Leu | Ser | Thr | Ala | Arg | Asp | Leu |
| 5090 | | | | | | 5095 | | | | | 5100 | | | |
| Thr | Arg | Asp | Ala | Leu | Phe | Arg | Val | Asp | Trp | Thr | Ala | Leu | Pro | Ala |
| 5105 | | | | | | 5110 | | | | | 5115 | | | |
| Gly | Gly | Ala | Val | Gly | Ser | Leu | Asp | Asp | Trp | Met | Leu | Leu | Gly | Ala |
| 5120 | | | | | | 5125 | | | | | 5130 | | | |
| Gly | Ser | Gln | Val | Tyr | Ala | Asp | Leu | Ala | Gly | Leu | Gly | Val | Ala | Val |
| 5135 | | | | | | 5140 | | | | | 5145 | | | |
| Ala | Glu | Gly | Gly | Gly | Ile | Pro | Ala | Ala | Leu | Val | Val | Pro | Val | Ser |
| 5150 | | | | | | 5155 | | | | | 5160 | | | |
| Glu | Pro | Asp | Ala | Glu | Ser | Ala | Ala | Gly | Gly | Val | Ala | Gly | Thr | Val |
| 5165 | | | | | | 5170 | | | | | 5175 | | | |
| His | Ala | Ala | Val | Glu | Arg | Ala | Leu | Ser | Leu | Val | Gln | Glu | Trp | Leu |
| 5180 | | | | | | 5185 | | | | | 5190 | | | |
| Ser | Asp | Glu | Arg | Phe | Ala | Asp | Ala | Arg | Leu | Val | Phe | Leu | Thr | Arg |
| 5195 | | | | | | 5200 | | | | | 5205 | | | |
| Gly | Ala | Val | Ala | Ala | Arg | Ala | Gly | Asp | Thr | Val | Pro | Gly | Leu | Val |
| 5210 | | | | | | 5215 | | | | | 5220 | | | |
| Gln | Ala | Ala | Val | Trp | Gly | Leu | Val | Arg | Ser | Ala | Gln | Ser | Glu | Asn |
| 5225 | | | | | | 5230 | | | | | 5235 | | | |
| Pro | Gly | Arg | Phe | Ala | Leu | Ile | Asp | Val | Asp | Gly | Asp | Gly | Asp | Gly |
| 5240 | | | | | | 5245 | | | | | 5250 | | | |
| Asp | Gly | Glu | Val | Asp | Gly | Asp | Val | Leu | Ser | Ala | Ala | Leu | Ala | Thr |
| 5255 | | | | | | 5260 | | | | | 5265 | | | |
| Gly | Glu | Pro | Glu | Leu | Ala | Val | Arg | Glu | Gly | Ala | Leu | Leu | Val | Pro |

| | | |
|-------------------------|---------------------|-----------------|
| 5270 | 5275 | 5280 |
| Arg Leu Ala Arg Ala Ala | Val Val Glu Gly Ala | Gly Arg Glu Leu |
| 5285 | 5290 | 5295 |
| Asp Val Asp Gly Thr Val | Leu Val Thr Gly Ala | Ser Gly Thr Leu |
| 5300 | 5305 | 5310 |
| Gly Gly Leu Phe Ala Arg | His Leu Val Val Glu | Arg Gly Val Arg |
| 5315 | 5320 | 5325 |
| Arg Leu Leu Leu Val Ser | Arg Arg Gly Glu Ala | Ala Glu Gly Ala |
| 5330 | 5335 | 5340 |
| Ala Glu Leu Gly Ala Glu | Leu Thr Glu Leu Gly | Ala Asp Val Arg |
| 5345 | 5350 | 5355 |
| Trp Ala Ala Cys Asp Val | Ala Asp Arg Asp Ala | Leu Glu Ala Val |
| 5360 | 5365 | 5370 |
| Leu Ala Gly Ile Pro Ala | Glu Tyr Pro Leu Ser | Gly Val Val His |
| 5375 | 5380 | 5385 |
| Thr Ala Gly Val Leu Asp | Asp Gly Val Val Ser | Ser Leu Thr Pro |
| 5390 | 5395 | 5400 |
| Glu Arg Leu Ser Ala Val | Leu Arg Pro Lys Val | Asp Ala Ala Trp |
| 5405 | 5410 | 5415 |
| Asn Leu His Glu Leu Thr | Arg Gly Leu Asp Leu | Ser Leu Phe Val |
| 5420 | 5425 | 5430 |
| Leu Phe Ser Ser Ala Ala | Gly Val Phe Gly Gly | Ala Gly Gln Ala |
| 5435 | 5440 | 5445 |
| Asn Tyr Ala Ala Ala Asn | Val Phe Leu Asp Ala | Leu Ala Gln His |
| 5450 | 5455 | 5460 |
| Arg Arg Ala Gln Gly Leu | Ala Ala Thr Ser Leu | Ala Trp Gly Leu |
| 5465 | 5470 | 5475 |
| Trp Ala Gly Val Gly Gly | Met Gly Gly Glu Leu | Thr Glu Ser Asp |
| 5480 | 5485 | 5490 |
| Arg Glu Arg Ile Asn Arg | Gly Gly Ile Thr Ala | Leu Glu Pro Glu |
| 5495 | 5500 | 5505 |
| Thr Gly Leu Ala Leu Phe | Asp Ala Ala Gln Arg | Thr Thr Asp Ala |
| 5510 | 5515 | 5520 |
| Leu Leu Val Pro Leu Pro | Leu Asp Leu Ala Ala | Leu Arg Val Gln |
| 5525 | 5530 | 5535 |
| Ala Gly Ser Gly Met Leu | Pro Asp Leu Leu Arg | Gly Leu Val Arg |
| 5540 | 5545 | 5550 |
| Val Pro Val Arg Arg Ala | Ala Gly Gln Gly Ser | Ala Ala Gly Gly |
| 5555 | 5560 | 5565 |
| Gly Ser Val Leu Arg Thr | Arg Leu Ala Ala Met | Pro Ala Asp Glu |

| | | |
|-------------------------|---------------------|-----------------|
| 5570 | 5575 | 5580 |
| Arg Asp Ala Ala Leu Leu | Asp Leu Val Arg Ala | Glu Val Ala Ala |
| 5585 | 5590 | 5595 |
| Val Leu Gly His Ala Ser | Thr Asp Glu Val Pro | Ala Asp Arg Ala |
| 5600 | 5605 | 5610 |
| Phe Lys Glu Leu Gly Phe | Asp Ser Leu Thr Ser | Val Glu Leu Arg |
| 5615 | 5620 | 5625 |
| Asn Arg Leu Gly Ala Thr | Thr Gly Glu Arg Leu | Ser Ala Thr Leu |
| 5630 | 5635 | 5640 |
| Val Phe Asp Tyr Pro Thr | Pro His Ala Leu Ala | Glu Phe Leu Arg |
| 5645 | 5650 | 5655 |
| Thr Glu Val Leu Gly Leu | Asp Glu Pro Thr Asp | Thr Ala Thr Thr |
| 5660 | 5665 | 5670 |
| Ala Pro Thr His Leu Gly | Thr Ser Leu Asp Asp | Asp Pro Ile Ala |
| 5675 | 5680 | 5685 |
| Ile Val Gly Met Ser Cys | Arg Tyr Pro Gly Gly | Val Glu Thr Pro |
| 5690 | 5695 | 5700 |
| Glu Asp Leu Trp Arg Leu | Val Val Gly Gly Gly | Asp Ala Ile Ser |
| 5705 | 5710 | 5715 |
| Glu Phe Pro Gln Gly Arg | Gly Trp Asp Leu Glu | Ser Leu Tyr Asp |
| 5720 | 5725 | 5730 |
| Pro Asp Pro Asp Gly Lys | Gly Thr Ser Tyr Thr | Arg Ser Gly Gly |
| 5735 | 5740 | 5745 |
| Phe Leu His Asp Ala Gly | Arg Phe Asp Pro Ala | Phe Phe Gly Ile |
| 5750 | 5755 | 5760 |
| Ser Pro Arg Glu Ala Val | Ala Met Asp Pro Gln | Gln Arg Leu Leu |
| 5765 | 5770 | 5775 |
| Leu Glu Thr Ser Trp Glu | Ala Phe Glu Arg Ala | Gly Ile Asp Pro |
| 5780 | 5785 | 5790 |
| Ala Ser Met Arg Gly Ser | Arg Thr Gly Val Phe | Ala Gly Ile Met |
| 5795 | 5800 | 5805 |
| Tyr His Asp Tyr Ala Thr | Arg Ile Thr Ser Val | Pro Asp Gly Val |
| 5810 | 5815 | 5820 |
| Glu Gly Tyr Leu Gly Thr | Gly Asn Ser Gly Ser | Ile Ala Ser Gly |
| 5825 | 5830 | 5835 |
| Arg Val Ser Tyr Ala Phe | Gly Leu Glu Gly Pro | Ala Val Thr Val |
| 5840 | 5845 | 5850 |
| Asp Thr Ala Cys Ser Ser | Ser Leu Val Ala Leu | His Trp Ala Ile |
| 5855 | 5860 | 5865 |
| Gln Ala Leu Arg Asn Gly | Glu Cys Thr Met Ala | Leu Ala Gly Gly |

| 5870 | | | | 5875 | | | | 5880 | | | | | | |
|------|-----|-----|-----|------|-----|------|-----|------|-----|-----|------|-----|-----|-----|
| Val | Thr | Val | Met | Ser | Thr | Pro | Gly | Thr | Phe | Thr | Glu | Phe | Ser | Arg |
| 5885 | | | | | | 5890 | | | | | 5895 | | | |
| Gln | Arg | Gly | Leu | Ala | Ala | Asp | Gly | Arg | Ile | Lys | Ser | Phe | Ala | Ala |
| 5900 | | | | | | 5905 | | | | | 5910 | | | |
| Ala | Ala | Asp | Gly | Thr | Ser | Trp | Ala | Glu | Gly | Ala | Gly | Met | Leu | Leu |
| 5915 | | | | | | 5920 | | | | | 5925 | | | |
| Val | Glu | Arg | Leu | Ser | Glu | Ala | Arg | Ala | Lys | Gly | His | Pro | Val | Leu |
| 5930 | | | | | | 5935 | | | | | 5940 | | | |
| Ala | Ile | Val | Arg | Gly | Ser | Ala | Ile | Asn | Gln | Asp | Gly | Ala | Ser | Asn |
| 5945 | | | | | | 5950 | | | | | 5955 | | | |
| Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln | Arg | Val | Ile | Arg |
| 5960 | | | | | | 5965 | | | | | 5970 | | | |
| Gln | Ala | Leu | Ala | Gly | Ala | Arg | Leu | Thr | Ser | Asp | Gln | Ile | Asp | Val |
| 5975 | | | | | | 5980 | | | | | 5985 | | | |
| Val | Glu | Ala | His | Gly | Thr | Gly | Thr | Thr | Leu | Gly | Asp | Pro | Ile | Glu |
| 5990 | | | | | | 5995 | | | | | 6000 | | | |
| Ala | Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Arg | Glu | Arg | Glu | Ala | Asp |
| 6005 | | | | | | 6010 | | | | | 6015 | | | |
| Gln | Pro | Leu | Trp | Leu | Gly | Ser | Ile | Lys | Ser | Asn | Met | Gly | His | Thr |
| 6020 | | | | | | 6025 | | | | | 6030 | | | |
| Gln | Ala | Ala | Ala | Gly | Val | Ala | Gly | Ile | Ile | Lys | Met | Ile | Met | Ala |
| 6035 | | | | | | 6040 | | | | | 6045 | | | |
| Ile | Arg | His | Gly | Val | Leu | Pro | Lys | Thr | Leu | His | Val | Asp | Glu | Pro |
| 6050 | | | | | | 6055 | | | | | 6060 | | | |
| Thr | Pro | His | Val | Asp | Trp | Glu | Ala | Gly | Ala | Val | Ser | Leu | Leu | Thr |
| 6065 | | | | | | 6070 | | | | | 6075 | | | |
| Glu | Ser | Val | Pro | Trp | Pro | Glu | Thr | Gly | Arg | Pro | Arg | Arg | Ala | Gly |
| 6080 | | | | | | 6085 | | | | | 6090 | | | |
| Val | Ser | Ser | Phe | Gly | Ile | Ser | Gly | Thr | Asn | Ala | His | Thr | Ile | Ile |
| 6095 | | | | | | 6100 | | | | | 6105 | | | |
| Glu | Gln | Ala | Pro | Glu | Glu | Phe | Val | Pro | Val | Arg | Val | Thr | Glu | Ser |
| 6110 | | | | | | 6115 | | | | | 6120 | | | |
| Gln | Thr | Pro | Gly | Ala | Gly | Ser | Arg | Val | Leu | Pro | Phe | Val | Leu | Ser |
| 6125 | | | | | | 6130 | | | | | 6135 | | | |
| Ala | Lys | Ser | Ala | Gly | Ala | Leu | Arg | Gly | Gln | Ala | Val | Arg | Leu | Lys |
| 6140 | | | | | | 6145 | | | | | 6150 | | | |
| Ala | His | Val | Glu | Ala | Ser | Pro | Glu | Val | Ser | Gly | Ala | Gly | Ala | Val |
| 6155 | | | | | | 6160 | | | | | 6165 | | | |
| Asp | Val | Ala | Tyr | Ser | Leu | Ala | Thr | Arg | Arg | Ala | Val | Phe | Asp | His |

| 6170 | 6175 | 6180 |
|---|------|------|
| Arg Ala Val Val Val Ala Gly Asp Arg Glu Glu Leu Leu Arg Ser 6185 6190 6195 | | |
| Leu Ala Ala Val Glu Ser Glu Gly Ala Ala Ala Gly Val Thr Arg 6200 6205 6210 | | |
| Gly Ala Val Gly Gly Gly Lys Leu Ala Phe Leu Phe Thr Gly Gln 6215 6220 6225 | | |
| Gly Ser Gln Arg Leu Gly Met Gly Arg Glu Leu Tyr Glu Thr Tyr 6230 6235 6240 | | |
| Pro Val Phe Ala Arg Ala Leu Asp Ala Ala Cys Ala Arg Leu Glu 6245 6250 6255 | | |
| Leu Pro Leu Lys Asp Ala Leu Phe Gly Thr Asp Ala Gly Leu Leu 6260 6265 6270 | | |
| Gly Glu Thr Ala Tyr Thr Gln Pro Ala Leu Phe Ala Val Glu Val 6275 6280 6285 | | |
| Ala Leu Phe Arg Leu Leu Glu Ser Trp Gly Val Arg Pro Asp Phe 6290 6295 6300 | | |
| Leu Ala Gly His Ser Ile Gly Glu Ile Ala Ala Ala His Val Ala 6305 6310 6315 | | |
| Gly Val Leu Ser Leu Asp Asp Ala Cys Ala Leu Val Glu Ala Arg 6320 6325 6330 | | |
| Gly Arg Leu Met Gln Ala Leu Pro Thr Gly Gly Val Met Ile Ala 6335 6340 6345 | | |
| Val Gln Ala Ser Glu Ala Glu Val Leu Pro Leu Leu Thr Asp Arg 6350 6355 6360 | | |
| Val Ser Ile Ala Ala Ile Asn Gly Pro Gln Ser Val Val Ile Ala 6365 6370 6375 | | |
| Gly Asp Glu Ala Asp Ala Val Ala Ile Val Glu Ser Phe Ser Gly 6380 6385 6390 | | |
| Arg Lys Ser Lys Arg Leu Thr Val Ser His Ala Phe His Ser Pro 6395 6400 6405 | | |
| His Met Asp Gly Met Leu Ala Gly Phe Arg Lys Val Ala Glu Ser 6410 6415 6420 | | |
| Leu Ser Tyr Glu Ala Pro Arg Ile Pro Val Val Ser Asn Leu Thr 6425 6430 6435 | | |
| Gly Ala Leu Val Thr Asp Glu Met Gly Ser Ala Asp Phe Trp Val 6440 6445 6450 | | |
| Arg His Val Arg Glu Ala Val Arg Phe Leu Asp Gly Ile Arg Thr 6455 6460 6465 | | |
| Leu Glu Ala Ala Gly Val Ala Thr Tyr Val Glu Leu Gly Pro Asp | | |

| 6470 | | | | | 6475 | | | | | 6480 | | | | |
|---------|---------|---------|---------|---------|---------|---------|-----|--|--|------|--|--|--|--|
| Gly Val | Leu Ser | Ala Met | Ala Gln | Asp Cys | Val Thr | Gly Glu | Gly | | | | | | | |
| 6485 | | | 6490 | | 6495 | | | | | | | | | |
| Ala Ala | Phe Ala | Pro Ala | Leu Arg | Lys Gly | Arg Pro | Glu Thr | Glu | | | | | | | |
| 6500 | | | 6505 | | 6510 | | | | | | | | | |
| Thr Ile | Thr Thr | Ala Leu | Ala Leu | Ala His | Ala His | Gly Thr | Ser | | | | | | | |
| 6515 | | | 6520 | | 6525 | | | | | | | | | |
| Val Asp | Trp Glu | Thr Tyr | Phe Ala | Gly Thr | Gly Ala | Gln Gly | Val | | | | | | | |
| 6530 | | | 6535 | | 6540 | | | | | | | | | |
| Glu Leu | Pro Thr | Tyr Ala | Phe Gln | Arg Asp | Trp Tyr | Trp Leu | Asn | | | | | | | |
| 6545 | | | 6550 | | 6555 | | | | | | | | | |
| Ser Ala | Val Val | Gln Ala | Gly Pro | Gly Asp | Ala Ser | Gly Phe | Gly | | | | | | | |
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| Thr Gln | Pro Trp | Leu Ala | Asp His | Ala Val | Leu Gly | Ser Val | Leu | | | | | | | |
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| Gln Val | Gly Cys | Asp Val | Leu Glu | Glu Leu | Thr Leu | Glu Ala | Pro | | | | | | | |
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| Leu Val | Val Pro | Glu Arg | Gly Gly | Val Gln | Leu Arg | Leu Thr | Val | | | | | | | |
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| Ala Ala | Trp Pro | Pro Ala | Gly Ala | Glu Pro | Val Asp | Ile Asp | Gly | | | | | | | |
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| Phe Gln | Gly Leu | Arg Thr | Ala Trp | Leu His | Gly Asp | Ala Val | Tyr | | | | | | | |
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| Ala Glu | Val Ser | Leu Asp | Glu Glu | Ser Ala | Glu Ser | Ala Glu | Trp | | | | | | | |
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| Gly Gly Arg His Glu Ser | Leu Phe Glu Ile Asp | Trp Ala Ala Leu | | |
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| Val Arg His Glu Ala His | Thr Gly Leu Ala Ala | Leu Ala Asp Thr | | |
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| Gly Arg Ala Ile Pro Glu | Val Val Cys Val Pro | Leu Ala Ala Ala | | |
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| Asn Ser Gln Asp Leu Ala | Gly Ala Gly Ala Val | His Ala Ala Val | | |
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| Glu Arg Ala Leu Gly Leu | Val Gln Glu Trp Leu | Ser Asp Glu Arg | | |
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| Phe Ala Asp Ala Arg Leu | Val Phe Leu Thr Arg | Gly Ala Val Ser | | |
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| Trp Gly Leu Val Arg Ser | Ala Gln Ser Glu Asn | Pro Gly Arg Phe | | |
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| Gly Ala Val Arg Val Pro | Arg Leu Thr Arg Ser | Thr Ala Val Ala | | |
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| Thr Gly Ala Ser Gly Thr | Leu Gly Gly Leu Phe | Ala Arg His Leu | | |

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| Leu | Asp | Ala | Leu | Ala | Gln | His | Arg | Arg | Ala | Gln | Gly | Leu | Ala | Ala |
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| Leu | Ala | Ala | Leu | Arg | Ala | Gln | Ala | Gly | Ser | Gly | Met | Leu | Pro | Pro |
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| Leu | Leu | Ser | Gly | Leu | Val | Arg | Thr | Pro | Thr | Arg | Arg | Ala | Ala | Gly |
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| Ala | Gly | Pro | Glu | Ala | Val | Asp | Pro | Ala | Arg | Ser | Phe | Ser | Glu | Val |

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| Ala Ala Thr Gly Val Arg | Leu Pro Ala Thr Leu | Val Phe Asp Tyr |
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| Pro Thr Pro Asp Ala Leu | Val Glu Tyr Leu Arg | Asp Glu Leu Trp |
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| Gln Asp Gly Ala Ala Ala | Val Pro Pro Leu Leu | Ala Glu Leu Asp |
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| Arg Leu Glu Lys Thr Leu | Val Ala Ser Val Pro | Asp Asp Asp Gly |
| 7445 | 7450 | 7455 |
| Arg Thr Arg Ile Thr Glu | Arg Leu Gln Ala Leu | Leu Ala Ala Trp |
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| Ser Glu Ala Gly Glu Ser | Thr Asp Thr Ala Asp | Ala Asp Val Ala |
| 7475 | 7480 | 7485 |
| Glu Ala Leu Glu Thr Ala | Thr Asp Asp Asp Leu | Phe Asp Phe Ile |
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| Gly Lys Glu Phe Gly Ile | Ser | |
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<212> DNA

<213> Streptomyces aizunensis

<400> 36

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| atcgcgatcg tcggcatgag ctgcaggttc cccggcggca tcgagtcgcc ggagggcctg | 180 |
| tgggacctgg tggccggtgg gcgggacgcg atcaccgatt tccccaccga ccgtggctgg | 240 |
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<212> PRT
<213> Streptomyces aizunensis

<400> 37

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| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |
| Leu | His | Glu | Thr | Arg | Arg | Arg | Leu | Gln | Glu | Val | Glu | Ser | Glu | Glu | Gln | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |
| Glu | Pro | Ile | Ala | Ile | Val | Gly | Met | Ser | Cys | Arg | Tyr | Pro | Gly | Asp | Val | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |
| Glu | Ser | Pro | Glu | Asp | Leu | Trp | Arg | Leu | Val | Ser | Glu | Glu | Thr | Asp | Ala | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |
| Ile | Ser | Pro | Phe | Pro | Thr | Asp | Arg | Gly | Trp | Asp | Met | Gly | Arg | Leu | Phe | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |
| Asp | Ala | Asp | Pro | Asp | Gly | Arg | Gly | Thr | Ser | Tyr | Val | Gln | Glu | Gly | Gly | |
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| Phe | Leu | His | Ser | Ala | Asn | Arg | Phe | Asp | Pro | Ala | Phe | Phe | Gly | Ile | Ser | |
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| Arg | Gly | Ser | Arg | Thr | Gly | Val | Phe | Ala | Gly | Val | Met | Tyr | His | Asp | Tyr | |
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| Ala | Ser | Arg | Leu | Arg | Ala | Val | Pro | Glu | Glu | Val | Glu | Gly | Tyr | Leu | Gly | |
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| Thr | Gly | Gly | Ser | Ser | Ser | Ile | Ala | Ser | Gly | Arg | Val | Ser | Tyr | Thr | Phe | |
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| Gly | Leu | Glu | Gly | Pro | Ala | Leu | Thr | Val | Asp | Thr | Ala | Cys | Ser | Ser | Ser | |
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| Leu | Val | Thr | Leu | His | Leu | Ala | Met | Gln | Ala | Leu | Arg | Lys | Gly | Glu | Cys | |
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| Ser | Leu | Ala | Leu | Ala | Gly | Gly | Val | Thr | Val | Met | Ala | Thr | Pro | Gly | Thr | |
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| | | | | | | | | | | | | | | | | |
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| Lys | Ser | Phe | Ala | Asp | Ser | Ala | Asp | Gly | Thr | Gly | Trp | Ala | Glu | Gly | Ala | |
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| Gly | Met | Leu | Leu | Val | Glu | Arg | Leu | Ser | Asp | Ala | Arg | Lys | Asn | Gly | His | |
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| Thr | Val | Leu | Ala | Val | Val | Arg | Gly | Ser | Ala | Val | Asn | Gln | Asp | Gly | Ala | |
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| Ser | Asn | Gly | Leu | Thr | Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln | Arg | Val | Ile | |
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| Gln | Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Arg | Glu | His | Thr | Glu | Asp | Ser | Pro | |
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| Arg | Ile | Pro | Lys | Thr | Leu | His | Val | Asp | Glu | Pro | Ser | Thr | Asn | Val | Asp | |
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| Trp | Ser | Ala | Gly | Ala | Val | Ser | Leu | Leu | Arg | Glu | Ser | Val | Glu | Trp | Pro | |
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| Gly | Thr | Asn | Ala | His | Thr | Ile | Ile | Glu | Gln | Ala | Pro | Leu | Pro | Glu | Ala | |
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| Glu | Thr | Glu | Thr | Glu | Pro | Thr | Gly | Asp | Glu | Thr | Asp | Gly | Ser | Glu | Ser | |
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| Thr | Asn | Pro | Asp | Gln | Ala | Pro | Val | Gly | Val | Ala | Leu | Ser | Leu | Ala | Thr | |
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| Gly | Arg | Ala | Ala | Leu | Glu | His | Arg | Ala | Val | Val | Val | Ala | Thr | Asp | Arg | |
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| Glu | Thr | Ala | Leu | Ala | Asp | Leu | Ala | Ala | Leu | Ala | Ser | Gly | Glu | Thr | Ser | 565 | 570 | 575 |
| Ala | Arg | Val | Val | Leu | Gly | Glu | Pro | Gly | Ala | Arg | Gly | Lys | Thr | Ala | Phe | 580 | 585 | 590 |
| Leu | Phe | Thr | Gly | Gln | Gly | Ser | Gln | Arg | Leu | Gly | Met | Gly | Arg | Glu | Leu | 595 | 600 | 605 |
| Tyr | Glu | Glu | Tyr | Pro | Val | Phe | Ala | Asp | Ala | Leu | Asp | Ala | Val | Cys | Ala | 610 | 615 | 620 |
| Arg | Leu | Glu | Leu | Pro | Leu | Lys | Asp | Val | Leu | Phe | Gly | Ala | Asp | Ala | Arg | 625 | 630 | 635 |
| Leu | Leu | Asp | Glu | Thr | Ala | Tyr | Thr | Gln | Pro | Ala | Leu | Phe | Ala | Val | Glu | 645 | 650 | 655 |
| Val | Ala | Leu | Phe | Arg | Leu | Val | Glu | Ser | Trp | Gly | Leu | Lys | Pro | Asp | Phe | 660 | 665 | 670 |
| Leu | Ala | Gly | His | Ser | Ile | Gly | Glu | Ile | Ala | Ala | Ala | His | Val | Ala | Gly | 675 | 680 | 685 |
| Val | Phe | Ser | Leu | Glu | Asp | Ala | Cys | Ala | Leu | Val | Ser | Ala | Arg | Gly | Arg | 690 | 695 | 700 |
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| Ser | Glu | Asp | Glu | Val | Leu | Pro | Leu | Leu | Thr | Ala | Arg | Val | Ser | Ile | Ala | 725 | 730 | 735 |
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| Thr | Val | Ser | His | Ala | Phe | His | Ser | Pro | His | Met | Asp | Gly | Met | Leu | Glu | 770 | 775 | 780 |
| Asp | Phe | Arg | Val | Val | Ala | Glu | Gly | Leu | Ser | Tyr | Glu | Ala | Pro | Arg | Ile | 785 | 790 | 795 |
| Pro | Val | Val | Ser | Asn | Leu | Thr | Gly | Ala | Leu | Val | Ser | Asp | Glu | Met | Gly | 805 | 810 | 815 |
| Ser | Ala | Asp | Phe | Trp | Val | Arg | His | Val | Arg | Glu | Ala | Val | Arg | Phe | Leu | 820 | 825 | 830 |
| Asp | Gly | Ile | Arg | Ala | Leu | Glu | Ala | Ala | Gly | Val | Thr | Thr | Tyr | Val | Glu | 835 | 840 | 845 |
| Leu | Gly | Pro | Asp | Gly | Val | Leu | Ser | Ala | Met | Ala | Gln | Ala | Cys | Val | Thr | 850 | 855 | 860 |
| Gly | Glu | Asn | Ser | Val | Phe | Val | Pro | Val | Leu | Arg | Ser | Gly | Arg | Ser | Glu | 865 | 870 | 875 |

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 Gly Thr Leu Gly Gly Asp Val Thr Thr Ala Gly Leu Arg Ser Ala Asp
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 Gly Gln Gly Arg Leu Pro Phe Ala Trp Ser Gly Val Ala Val His
 1160 1165 1170
 Ala Val Gly Ala Asp Thr Leu Arg Val Arg Leu Ser Arg Ala Gly
 1175 1180 1185

| | | | | | | | | | | | | | | |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Gln | Asp | Ala | Val | Ala | Leu | Glu | Ile | Ala | Asp | Ala | Asp | Gly | Ala | Pro |
| 1190 | | | | | | 1195 | | | | | 1200 | | | |
| Val | Ala | Ser | Val | Arg | Ser | Leu | Ala | Leu | Arg | Ala | Phe | Ser | Pro | Asp |
| 1205 | | | | | | 1210 | | | | | 1215 | | | |
| Gln | Leu | Thr | Gly | Pro | Asp | Gly | Ala | Gly | His | Gly | Asp | Ala | Leu | Phe |
| 1220 | | | | | | 1225 | | | | | 1230 | | | |
| Arg | Val | Asp | Trp | Ala | Ala | Leu | Pro | Ala | Gly | Gly | Ala | Val | Gly | Ser |
| 1235 | | | | | | 1240 | | | | | 1245 | | | |
| Leu | Asp | Asp | Trp | Met | Leu | Leu | Gly | Ala | Gly | Ser | Gln | Val | Tyr | Ala |
| 1250 | | | | | | 1255 | | | | | 1260 | | | |
| Asp | Leu | Ala | Gly | Leu | Gly | Val | Ala | Val | Ala | Glu | Gly | Gly | Gly | Ile |
| 1265 | | | | | | 1270 | | | | | 1275 | | | |
| Pro | Ala | Ala | Leu | Val | Val | Pro | Val | Ser | Glu | Pro | Asp | Ala | Glu | Ser |
| 1280 | | | | | | 1285 | | | | | 1290 | | | |
| Ala | Ala | Gly | Gly | Val | Ala | Gly | Ala | Val | His | Ala | Ala | Val | Glu | Arg |
| 1295 | | | | | | 1300 | | | | | 1305 | | | |
| Ala | Leu | Gly | Leu | Val | Gln | Glu | Trp | Leu | Ser | Asp | Glu | Arg | Phe | Ala |
| 1310 | | | | | | 1315 | | | | | 1320 | | | |
| Asp | Ala | Arg | Leu | Val | Phe | Leu | Thr | Arg | Gly | Ala | Ala | Ala | Ala | Arg |
| 1325 | | | | | | 1330 | | | | | 1335 | | | |
| Ala | Gly | Asp | Thr | Val | Pro | Gly | Leu | Val | Gln | Ala | Ala | Val | Arg | Gly |
| 1340 | | | | | | 1345 | | | | | 1350 | | | |
| Leu | Val | Arg | Ser | Ala | Gln | Ser | Glu | Asn | Pro | Gly | Arg | Phe | Ala | Leu |
| 1355 | | | | | | 1360 | | | | | 1365 | | | |
| Ile | Asp | Val | Asp | Gly | Asp | Gly | Glu | Val | Asp | Ala | Glu | Val | Leu | Ser |
| 1370 | | | | | | 1375 | | | | | 1380 | | | |
| Ala | Ala | Leu | Ala | Thr | Gly | Glu | Pro | Glu | Leu | Ala | Val | Arg | Glu | Ala |
| 1385 | | | | | | 1390 | | | | | 1395 | | | |
| Ala | Leu | Leu | Val | Pro | Arg | Leu | Ala | Arg | Ala | Ala | Val | Ala | Val | Glu |
| 1400 | | | | | | 1405 | | | | | 1410 | | | |
| Pro | Ala | Pro | Glu | Leu | Gly | Ser | Asp | Gly | Thr | Val | Leu | Val | Thr | Gly |
| 1415 | | | | | | 1420 | | | | | 1425 | | | |
| Ala | Ser | Gly | Thr | Leu | Gly | Gly | Leu | Phe | Ala | Arg | His | Leu | Val | Val |
| 1430 | | | | | | 1435 | | | | | 1440 | | | |
| Glu | Arg | Gly | Val | Arg | Arg | Leu | Leu | Leu | Val | Ser | Arg | Arg | Gly | Glu |
| 1445 | | | | | | 1450 | | | | | 1455 | | | |
| Ala | Ala | Glu | Gly | Ala | Ala | Glu | Leu | Gly | Ala | Glu | Leu | Thr | Gly | Leu |
| 1460 | | | | | | 1465 | | | | | 1470 | | | |
| Gly | Ala | Asp | Val | Arg | Trp | Ala | Ala | Cys | Asp | Val | Ala | Asp | Arg | Glu |
| 1475 | | | | | | 1480 | | | | | 1485 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Ala | Leu | Glu | Ser | Val | Leu | Ala | Gly | Ile | Pro | Ala | Glu | Tyr | Pro | Leu |
| 1490 | | | | | | 1495 | | | | | 1500 | | | |
| Ser | Gly | Val | Val | His | Thr | Ala | Gly | Val | Leu | Asp | Asp | Gly | Val | Val |
| 1505 | | | | | | 1510 | | | | | 1515 | | | |
| Ser | Ser | Leu | Thr | Ala | Glu | Arg | Val | Ser | Ala | Val | Leu | Arg | Pro | Lys |
| 1520 | | | | | | 1525 | | | | | 1530 | | | |
| Val | Asp | Ala | Ala | Trp | Asn | Leu | His | Glu | Leu | Thr | Arg | Gly | Leu | Asp |
| 1535 | | | | | | 1540 | | | | | 1545 | | | |
| Leu | Ser | Leu | Phe | Val | Leu | Phe | Ser | Ser | Ala | Ala | Gly | Val | Phe | Gly |
| 1550 | | | | | | 1555 | | | | | 1560 | | | |
| Gly | Ala | Gly | Gln | Ala | Asn | Tyr | Ala | Ala | Ala | Asn | Val | Phe | Leu | Asp |
| 1565 | | | | | | 1570 | | | | | 1575 | | | |
| Ala | Leu | Ala | Gln | His | Arg | Arg | Ala | Gln | Gly | Leu | Ala | Ala | Thr | Ser |
| 1580 | | | | | | 1585 | | | | | 1590 | | | |
| Leu | Ala | Trp | Gly | Leu | Trp | Asp | Glu | Pro | Gly | Gly | Met | Ala | Gly | Ala |
| 1595 | | | | | | 1600 | | | | | 1605 | | | |
| Leu | Asp | Ala | Asp | Asp | Val | Ser | Arg | Leu | Gly | Arg | Gly | Gly | Val | Ser |
| 1610 | | | | | | 1615 | | | | | 1620 | | | |
| Gly | Leu | Ser | Ala | Gly | Glu | Gly | Val | Ala | Leu | Phe | Asp | Ala | Ala | Ser |
| 1625 | | | | | | 1630 | | | | | 1635 | | | |
| Ala | Ser | Glu | Gln | Ala | Leu | Phe | Val | Pro | Val | Lys | Leu | Asp | Leu | Ala |
| 1640 | | | | | | 1645 | | | | | 1650 | | | |
| Ala | Leu | Arg | Ala | Gln | Ala | Gly | Ser | Gly | Met | Leu | Pro | Pro | Leu | Leu |
| 1655 | | | | | | 1660 | | | | | 1665 | | | |
| Ser | Gly | Leu | Val | Arg | Thr | Pro | Thr | Arg | Arg | Ala | Ala | Arg | Gly | Gly |
| 1670 | | | | | | 1675 | | | | | 1680 | | | |
| Ser | Ala | Ala | Gly | Gly | Thr | Phe | Ala | Arg | Lys | Leu | Ala | Gly | Leu | Ala |
| 1685 | | | | | | 1690 | | | | | 1695 | | | |
| Val | Asp | Gln | Arg | Ser | Ala | Ala | Val | Met | Glu | Leu | Val | Arg | Ala | Gln |
| 1700 | | | | | | 1705 | | | | | 1710 | | | |
| Val | Ala | Ala | Val | Leu | Gly | Leu | Ala | Gly | Pro | Glu | Ala | Val | Asp | Pro |
| 1715 | | | | | | 1720 | | | | | 1725 | | | |
| Ala | Arg | Ser | Phe | Ser | Glu | Val | Gly | Phe | Asp | Ser | Leu | Thr | Ala | Val |
| 1730 | | | | | | 1735 | | | | | 1740 | | | |
| Glu | Leu | Arg | Asn | Arg | Leu | Gly | Ala | Ala | Thr | Gly | Val | Arg | Leu | Pro |
| 1745 | | | | | | 1750 | | | | | 1755 | | | |
| Ala | Thr | Leu | Val | Phe | Asp | Tyr | Pro | Thr | Ser | Leu | Ala | Leu | Ala | Asp |
| 1760 | | | | | | 1765 | | | | | 1770 | | | |
| Phe | Leu | Gly | Gly | Glu | Leu | Leu | Gly | Gly | Gln | Glu | Ala | Ala | Ala | Ala |
| 1775 | | | | | | 1780 | | | | | 1785 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Pro | Thr | Ala | Phe | Thr | Ala | Arg | Asp | Asp | Glu | Pro | Ile | Ala | Ile | Val |
| 1790 | | | | | | 1795 | | | | | 1800 | | | |
| Ala | Met | Ser | Cys | Arg | Phe | Pro | Gly | Gly | Val | Arg | Ser | Pro | Glu | Asp |
| 1805 | | | | | | 1810 | | | | | 1815 | | | |
| Leu | Trp | Gly | Leu | Val | Leu | Asp | Gly | Arg | Asp | Ala | Ile | Ser | Asp | Met |
| 1820 | | | | | | 1825 | | | | | 1830 | | | |
| Pro | Asp | Asp | Arg | Gly | Trp | Asp | Val | Glu | Gly | Leu | Phe | Asp | Pro | Asp |
| 1835 | | | | | | 1840 | | | | | 1845 | | | |
| Pro | Asp | Arg | Pro | Gly | Thr | Ser | Tyr | Ser | Arg | Ala | Gly | Gly | Phe | Leu |
| 1850 | | | | | | 1855 | | | | | 1860 | | | |
| His | Asp | Ala | His | His | Phe | Asp | Pro | Thr | Phe | Phe | Gly | Ile | Ser | Pro |
| 1865 | | | | | | 1870 | | | | | 1875 | | | |
| Arg | Glu | Ala | Leu | Ala | Thr | Asp | Pro | Gln | Gln | Arg | Leu | Leu | Leu | Glu |
| 1880 | | | | | | 1885 | | | | | 1890 | | | |
| Thr | Ser | Trp | Glu | Ala | Phe | Glu | Arg | Ala | Gly | Ile | Asp | Pro | Ala | Thr |
| 1895 | | | | | | 1900 | | | | | 1905 | | | |
| Val | Arg | Gly | Ser | Arg | Thr | Gly | Val | Phe | Ala | Gly | Val | Met | Tyr | Asn |
| 1910 | | | | | | 1915 | | | | | 1920 | | | |
| Asp | Tyr | Gly | Thr | Leu | Leu | His | Arg | Ala | Pro | Glu | Gly | Leu | Glu | Gly |
| 1925 | | | | | | 1930 | | | | | 1935 | | | |
| Tyr | Met | Gly | Thr | Ser | Ser | Ser | Gly | Ser | Val | Ala | Ser | Gly | Arg | Val |
| 1940 | | | | | | 1945 | | | | | 1950 | | | |
| Ser | Tyr | Thr | Phe | Gly | Leu | Glu | Gly | Pro | Ala | Val | Thr | Val | Asp | Thr |
| 1955 | | | | | | 1960 | | | | | 1965 | | | |
| Ala | Cys | Ser | Ser | Ser | Leu | Val | Thr | Leu | His | Leu | Ala | Val | Gln | Ala |
| 1970 | | | | | | 1975 | | | | | 1980 | | | |
| Leu | Arg | Asn | Gly | Glu | Cys | Asp | Leu | Ala | Leu | Ala | Gly | Gly | Val | Thr |
| 1985 | | | | | | 1990 | | | | | 1995 | | | |
| Val | Met | Ala | Thr | Pro | Gly | Thr | Phe | Val | Ala | Phe | Ser | Arg | Gln | Arg |
| 2000 | | | | | | 2005 | | | | | 2010 | | | |
| Gly | Leu | Ala | Ser | Asp | Gly | Arg | Cys | Lys | Pro | Phe | Ala | Ala | Ala | Ala |
| 2015 | | | | | | 2020 | | | | | 2025 | | | |
| Asp | Gly | Thr | Ala | Trp | Gly | Glu | Gly | Val | Gly | Met | Leu | Leu | Val | Glu |
| 2030 | | | | | | 2035 | | | | | 2040 | | | |
| Arg | Leu | Ser | Asp | Ala | Arg | Ala | Lys | Gly | His | Pro | Val | Leu | Ala | Val |
| 2045 | | | | | | 2050 | | | | | 2055 | | | |
| Val | Arg | Gly | Ser | Ala | Ile | Asn | Gln | Asp | Gly | Ala | Ser | Asn | Gly | Leu |
| 2060 | | | | | | 2065 | | | | | 2070 | | | |
| Thr | Ala | Pro | Asn | Gly | Pro | Ser | Gln | Gln | Arg | Val | Ile | Arg | Gln | Ala |
| 2075 | | | | | | 2080 | | | | | 2085 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Leu | Ala | Ser | Ala | Gly | Leu | Ser | Ala | Ala | Asp | Val | Asp | Val | Val | Glu |
| 2090 | | | | | | 2095 | | | | | 2100 | | | |
| Ala | His | Gly | Thr | Gly | Thr | Thr | Leu | Gly | Asp | Pro | Ile | Glu | Ala | Gln |
| 2105 | | | | | | 2110 | | | | | 2115 | | | |
| Ala | Leu | Leu | Ala | Thr | Tyr | Gly | Gln | Glu | His | Thr | Asp | Asp | Ser | Pro |
| 2120 | | | | | | 2125 | | | | | 2130 | | | |
| Leu | Trp | Leu | Gly | Ser | Ile | Lys | Ser | Asn | Phe | Gly | His | Thr | Gln | Ala |
| 2135 | | | | | | 2140 | | | | | 2145 | | | |
| Ala | Ala | Gly | Val | Ala | Gly | Ile | Ile | Lys | Met | Val | Gln | Ala | Met | His |
| 2150 | | | | | | 2155 | | | | | 2160 | | | |
| His | Gly | Val | Val | Pro | Lys | Thr | Leu | His | Val | Asp | Glu | Pro | Ser | Pro |
| 2165 | | | | | | 2170 | | | | | 2175 | | | |
| His | Val | Asp | Trp | Ser | Ala | Gly | Ala | Val | Ser | Leu | Leu | Thr | Glu | Gln |
| 2180 | | | | | | 2185 | | | | | 2190 | | | |
| Met | Ala | Trp | Pro | Glu | Thr | Gly | Arg | Pro | Arg | Arg | Ala | Ala | Ile | Ser |
| 2195 | | | | | | 2200 | | | | | 2205 | | | |
| Ser | Phe | Gly | Ile | Ser | Gly | Thr | Asn | Ala | His | Thr | Ile | Ile | Glu | Gln |
| 2210 | | | | | | 2215 | | | | | 2220 | | | |
| Ala | Pro | Glu | Glu | Phe | Ala | Pro | Val | Arg | Pro | Val | Arg | Val | Ile | Glu |
| 2225 | | | | | | 2230 | | | | | 2235 | | | |
| Pro | Glu | Ala | Val | Gly | Ala | Gly | Ser | Arg | Val | Leu | Pro | Phe | Val | Leu |
| 2240 | | | | | | 2245 | | | | | 2250 | | | |
| Ser | Ala | Lys | Ser | Ala | Gly | Ala | Leu | Arg | Gly | Gln | Ala | Val | Arg | Leu |
| 2255 | | | | | | 2260 | | | | | 2265 | | | |
| Lys | Ala | His | Val | Glu | Ala | Ser | Pro | Glu | Val | Ser | Gly | Ala | Gly | Ala |
| 2270 | | | | | | 2275 | | | | | 2280 | | | |
| Ala | Asp | Val | Ala | Tyr | Ser | Leu | Ala | Thr | Arg | Arg | Ala | Val | Phe | Asp |
| 2285 | | | | | | 2290 | | | | | 2295 | | | |
| His | Arg | Ala | Val | Val | Val | Ala | Gly | Asp | Arg | Glu | Glu | Leu | Leu | Arg |
| 2300 | | | | | | 2305 | | | | | 2310 | | | |
| Ala | Leu | Ala | Ala | Val | Glu | Ser | Glu | Gly | Thr | Ala | Ala | Gly | Val | Thr |
| 2315 | | | | | | 2320 | | | | | 2325 | | | |
| Arg | Gly | Thr | Ala | Gly | Gly | Gly | Lys | Leu | Ala | Phe | Leu | Phe | Thr | Gly |
| 2330 | | | | | | 2335 | | | | | 2340 | | | |
| Gln | Gly | Ser | Gln | Arg | Leu | Gly | Met | Gly | Arg | Glu | Leu | Tyr | Glu | Thr |
| 2345 | | | | | | 2350 | | | | | 2355 | | | |
| Tyr | Pro | Val | Phe | Ala | Arg | Ala | Leu | Asp | Ala | Ala | Cys | Ala | Gly | Leu |
| 2360 | | | | | | 2365 | | | | | 2370 | | | |
| Glu | Leu | Pro | Leu | Lys | Asp | Ala | Leu | Phe | Gly | Ala | Asp | Ala | Gly | Leu |
| 2375 | | | | | | 2380 | | | | | 2385 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Leu | Asp | Glu | Thr | Ala | Tyr | Thr | Gln | Pro | Ala | Leu | Phe | Ala | Val | Glu |
| 2390 | | | | | | 2395 | | | | | 2400 | | | |
| Val | Ala | Leu | Phe | Arg | Leu | Leu | Glu | Ser | Trp | Gly | Val | Arg | Pro | Asp |
| 2405 | | | | | | 2410 | | | | | 2415 | | | |
| Phe | Leu | Ala | Gly | His | Ser | Ile | Gly | Glu | Ile | Ala | Ala | Ala | His | Val |
| 2420 | | | | | | 2425 | | | | | 2430 | | | |
| Ala | Gly | Val | Leu | Ser | Leu | Asp | Asp | Ala | Cys | Ala | Leu | Val | Ala | Ala |
| 2435 | | | | | | 2440 | | | | | 2445 | | | |
| Arg | Gly | Arg | Leu | Met | Gln | Ala | Leu | Pro | Thr | Gly | Gly | Val | Met | Ile |
| 2450 | | | | | | 2455 | | | | | 2460 | | | |
| Ala | Val | Gln | Ala | Ser | Glu | Asp | Glu | Val | Leu | Pro | Leu | Leu | Thr | Asp |
| 2465 | | | | | | 2470 | | | | | 2475 | | | |
| Arg | Val | Ser | Ile | Ala | Ala | Ile | Asn | Gly | Pro | Gln | Ser | Val | Val | Ile |
| 2480 | | | | | | 2485 | | | | | 2490 | | | |
| Ala | Gly | Asp | Glu | Ala | Asp | Ala | Val | Ala | Ile | Val | Glu | Ser | Phe | Ser |
| 2495 | | | | | | 2500 | | | | | 2505 | | | |
| Gly | Arg | Lys | Ser | Lys | Arg | Leu | Thr | Val | Ser | His | Ala | Phe | His | Ser |
| 2510 | | | | | | 2515 | | | | | 2520 | | | |
| Pro | His | Met | Asp | Gly | Met | Leu | Ala | Gly | Phe | Arg | Lys | Val | Ala | Glu |
| 2525 | | | | | | 2530 | | | | | 2535 | | | |
| Ser | Leu | Ser | Tyr | Glu | Ala | Pro | Arg | Ile | Pro | Val | Val | Ser | Asn | Leu |
| 2540 | | | | | | 2545 | | | | | 2550 | | | |
| Thr | Gly | Ala | Leu | Val | Thr | Asp | Glu | Met | Gly | Ser | Ala | Asp | Phe | Trp |
| 2555 | | | | | | 2560 | | | | | 2565 | | | |
| Val | Arg | His | Val | Arg | Glu | Ala | Val | Arg | Phe | Leu | Asp | Gly | Ile | Arg |
| 2570 | | | | | | 2575 | | | | | 2580 | | | |
| Ala | Leu | Glu | Ala | Ala | Gly | Val | Thr | Ala | Tyr | Val | Glu | Leu | Gly | Pro |
| 2585 | | | | | | 2590 | | | | | 2595 | | | |
| Asp | Gly | Val | Leu | Ser | Ala | Leu | Ala | Gln | Glu | Cys | Val | Thr | Gly | Glu |
| 2600 | | | | | | 2605 | | | | | 2610 | | | |
| Gly | Ala | Ala | Phe | Ala | Pro | Ala | Leu | Arg | Lys | Gly | Arg | Pro | Glu | Ala |
| 2615 | | | | | | 2620 | | | | | 2625 | | | |
| Glu | Thr | Ile | Thr | Thr | Ala | Leu | Ala | Leu | Ala | His | Asn | His | Gly | Thr |
| 2630 | | | | | | 2635 | | | | | 2640 | | | |
| Ser | Val | Asp | Trp | Glu | Thr | Tyr | Phe | Ser | Gly | Thr | Gly | Ala | Gln | Arg |
| 2645 | | | | | | 2650 | | | | | 2655 | | | |
| Val | Asp | Leu | Pro | Thr | Tyr | Ala | Phe | Gln | Arg | Glu | Arg | Tyr | Trp | Ile |
| 2660 | | | | | | 2665 | | | | | 2670 | | | |
| Asp | Val | Pro | Val | His | Ser | Val | Gly | Asp | Val | Ala | Ser | Ala | Gly | Leu |
| 2675 | | | | | | 2680 | | | | | 2685 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Gly | Ala | Ala | Glu | His | Pro | Leu | Leu | Gly | Ala | Ala | Val | Glu | Leu | Pro |
| 2690 | | | | | | 2695 | | | | | 2700 | | | |
| Asp | Ser | Asp | Gly | Leu | Leu | Leu | Thr | Gly | Arg | Leu | Ser | Leu | Leu | Ser |
| 2705 | | | | | | 2710 | | | | | 2715 | | | |
| His | Pro | Trp | Leu | Ala | Asp | His | Ala | Val | Ala | Gly | Thr | Val | Leu | Leu |
| 2720 | | | | | | 2725 | | | | | 2730 | | | |
| Pro | Gly | Thr | Ala | Phe | Val | Glu | Leu | Ala | Leu | His | Ala | Gly | Gln | Arg |
| 2735 | | | | | | 2740 | | | | | 2745 | | | |
| Val | Gly | Ser | Gly | Leu | Leu | Glu | Glu | Leu | Thr | Leu | Glu | Ala | Pro | Leu |
| 2750 | | | | | | 2755 | | | | | 2760 | | | |
| Val | Leu | Pro | Glu | Arg | Gly | Ala | Leu | Gln | Leu | Arg | Val | Ser | Val | Ala |
| 2765 | | | | | | 2770 | | | | | 2775 | | | |
| Ala | Pro | Asp | Glu | Ala | Gly | Arg | Arg | Ala | Leu | His | Val | His | Ser | Arg |
| 2780 | | | | | | 2785 | | | | | 2790 | | | |
| Pro | Glu | Asp | Leu | Gly | Gly | Glu | Asp | Arg | Thr | Gly | His | Glu | Val | Pro |
| 2795 | | | | | | 2800 | | | | | 2805 | | | |
| Trp | Thr | Arg | His | Ala | Gly | Gly | Val | Leu | Ala | Ala | Pro | Glu | Ala | Ala |
| 2810 | | | | | | 2815 | | | | | 2820 | | | |
| Gly | Ala | Ala | Pro | Glu | Glu | Ser | Gly | Leu | Asp | Val | Trp | Pro | Pro | Ala |
| 2825 | | | | | | 2830 | | | | | 2835 | | | |
| Asp | Ala | Glu | Pro | Leu | Asp | Ala | Gly | Asp | Leu | Tyr | Asp | Arg | Phe | Ala |
| 2840 | | | | | | 2845 | | | | | 2850 | | | |
| Glu | Gly | Gly | Phe | Ala | Tyr | Gly | Pro | Val | Phe | Arg | Asn | Leu | Arg | Ala |
| 2855 | | | | | | 2860 | | | | | 2865 | | | |
| Ala | Trp | Arg | Arg | Gly | Asp | Glu | Leu | Phe | Ala | Glu | Leu | Leu | Leu | Pro |
| 2870 | | | | | | 2875 | | | | | 2880 | | | |
| Glu | Gly | Gln | Leu | Ala | Gln | Ala | Gly | His | Phe | Gly | Val | His | Pro | Ala |
| 2885 | | | | | | 2890 | | | | | 2895 | | | |
| Leu | Leu | Asp | Ala | Gly | Leu | His | Gly | Leu | Ala | Leu | Gly | Ser | Phe | His |
| 2900 | | | | | | 2905 | | | | | 2910 | | | |
| Asp | Gly | Ala | Asp | Glu | Asp | Ala | Arg | Ile | Arg | Leu | Pro | Phe | Ser | Phe |
| 2915 | | | | | | 2920 | | | | | 2925 | | | |
| Ser | Gly | Val | Ala | Leu | His | Ser | Val | Gly | Ala | Gly | Ser | Leu | Arg | Val |
| 2930 | | | | | | 2935 | | | | | 2940 | | | |
| Arg | Leu | Ala | Pro | Ala | Gly | Ser | Gly | Ala | Val | Ser | Leu | Ala | Ala | Phe |
| 2945 | | | | | | 2950 | | | | | 2955 | | | |
| Asp | Glu | Gln | Gly | Ala | Pro | Val | Val | Ser | Val | Glu | Ser | Leu | Leu | Leu |
| 2960 | | | | | | 2965 | | | | | 2970 | | | |
| Arg | Ala | Val | Asp | Pro | Ala | Arg | Leu | Lys | Ala | Ala | Glu | Gln | Pro | Val |
| 2975 | | | | | | 2980 | | | | | 2985 | | | |

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|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Phe | His | Glu | Ser | Leu | Phe | Arg | Leu | Glu | Trp | Pro | Ala | Leu | Ala | Ala |
| 2990 | | | | | | 2995 | | | | | 3000 | | | |
| Gly | Pro | Arg | Thr | Asp | Asn | Ala | Pro | Gly | Asp | Gly | Gly | Arg | Trp | Ala |
| 3005 | | | | | | 3010 | | | | | 3015 | | | |
| Val | Val | Gly | Ala | Asp | Ser | Leu | Gly | Leu | Glu | Ala | Gly | Leu | Arg | Ala |
| 3020 | | | | | | 3025 | | | | | 3030 | | | |
| Asp | Gly | Val | Ala | Val | Asp | Gly | Tyr | Ala | Asp | Leu | Ser | Ala | Leu | Ala |
| 3035 | | | | | | 3040 | | | | | 3045 | | | |
| Gly | Val | Val | Ala | Ala | Gly | Lys | Pro | Gln | Pro | Asp | Thr | Val | Leu | Val |
| 3050 | | | | | | 3055 | | | | | 3060 | | | |
| Ser | Tyr | Ala | Ser | Ser | Gly | Pro | Gly | Ile | Arg | Thr | Ala | Asp | Ala | Val |
| 3065 | | | | | | 3070 | | | | | 3075 | | | |
| Arg | Gln | Ala | Ala | His | Asp | Ala | Leu | Glu | Leu | Val | Gln | Gly | Trp | Leu |
| 3080 | | | | | | 3085 | | | | | 3090 | | | |
| Ala | Glu | Glu | Ser | Leu | Ala | Gly | Ser | Arg | Leu | Val | Val | Val | Thr | Arg |
| 3095 | | | | | | 3100 | | | | | 3105 | | | |
| Gly | Ala | Val | Glu | Ala | Arg | Pro | Gly | Glu | Gly | Val | Pro | Asp | Leu | Ala |
| 3110 | | | | | | 3115 | | | | | 3120 | | | |
| His | Ala | Ala | Val | Trp | Gly | Leu | Leu | Arg | Ser | Ala | Gln | Ser | Glu | Asn |
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| Ser | Ile | Ser | Gly | Pro | His | Gln | Tyr | Ala | Arg | Phe | Ala | Ser | Ala | Phe |
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| agctgccgct | acccgggaga | cgtcgagtcg | cccgaggacc | tgtggcggct | ggtgtccgag | 180 |
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| ctcgccacct | acggtcagga | gcacacggac | gacagcccgc | tgtggctggg | gtccatcaag | 6420 |
| tccaacttcg | gtcacacgca | ggccgctgcc | ggtgtcgcgg | gcatcatcaa | gatggtgcag | 6480 |
| gcgatgcacc | acgggggtcgt | ccccaaagacg | ctgcacgtgg | acgagccgtc | cccgcacgtg | 6540 |
| gactggtcgg | cgggcgcggg | ctcgtctctc | accgagcaga | tggcctggcc | cgaaacgggc | 6600 |
| cgtccccgcc | gcgcggcgat | ttcttccttc | ggtatcagcg | gtaccaacgc | gcacacgatc | 6660 |
| atcgagcagg | cgccggagga | gttcgctccg | gtccgtccgg | tccgtgtgat | cgagccggag | 6720 |
| gcggtgggtg | cgggttcgcg | ggtgctgccg | tctgtgttgt | ccgcgaagtc | ggcggggggc | 6780 |
| ttgcgtggtc | aggcgggtgcg | tctgaaggcg | catgtggagg | cttcgccgga | ggtgtcgggg | 6840 |
| gccggggctg | ctgatgtggc | gtattcgctg | gcgacgcggc | gtgcgggtctt | cgaccaccgt | 6900 |
| gcggtgggtg | tggccgggtga | ccgtgaggag | ctgttgctg | ctctggctgc | tgtggagtcg | 6960 |
| gagggcacgg | cggctggtgt | gacccgtggg | acggcgggtg | gcggaaagct | tgccttctctg | 7020 |
| ttcacggggc | aggggagcca | gcggctgggg | atggggcgtg | agctgtacga | gacctatccc | 7080 |
| gtcttcgcgc | gggctctgga | cgcggcgtgt | gctggtctcg | aactgccgct | gaaggatgcg | 7140 |

| | | | | | | |
|------------|------------|------------|------------|-------------|------------|------|
| ctgttcggcg | ccgatgcggg | tctgctggac | gagacggcgt | acaccagcc | cgctctcttc | 7200 |
| gcggtcgagg | tggcggttgt | ccgactgctg | gagagctggg | gtgtgaggcc | ggacttcctg | 7260 |
| gccgggcact | cgatcggtga | gatcgcgggc | gcgcatgtgg | ccgggggtgct | gtccctggac | 7320 |
| gacgcctgtg | cgctggtcgc | ggcccgcggc | cggctcatgc | aggcgctgcc | caccggcggt | 7380 |
| gtgatgatcg | ccgtccaggc | gtcggaggac | gaggtcctgc | cgctgctgac | cgaccgggtg | 7440 |
| agcatcgccg | cgatcaacgg | tccgcagtcg | gtcgtgatcg | ggggcgacga | ggccgacgcg | 7500 |
| gtggcgatcg | tggagtcctt | ctcggggcgc | aagtccaagc | ggctcacggt | cagtcatgcg | 7560 |
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| tcgtacgagg | ctccgcgcac | cccggtcgtc | tcgaacctca | ccggggccct | ggtcaccgac | 7680 |
| gagatggggt | cggccgactt | ctgggtccgg | cacgttcgcg | aggcggtccg | tttcctggac | 7740 |
| ggatatccgg | ccctggaggc | cgcgggcgtg | acggcgtagc | tcgaactcgg | tcccgcaggt | 7800 |
| gttctgtcgg | cgttgggcca | ggagtgcgtc | accggcgagg | gtgcggcctt | cgcgcccgc | 7860 |
| ctccgcaagg | gccgccccga | ggccgagacg | atcacaacgg | ccctcgccct | tgcccacaac | 7920 |
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| gaactgccc | actccgacgg | gctgctgctc | accggtcggc | tgctcgtcct | gtcgcacccc | 8160 |
| tggttgggcg | atcacgccgt | cgcgggcacc | gttctgctcc | ccgggaccgc | cttcgtggag | 8220 |
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| gcgcgcgtgg | tgcttcccga | gcgcggggcg | ctccagctgc | gggtgtccgt | ggccgcgccc | 8340 |
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| gaaccgctcg | atgccggcga | cctgtacgac | cggttcgccg | agggcggggt | cgcgtaaggt | 8580 |
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| gacgcgggtc | tgcacggcct | cgcgctcggc | tcgttccatg | acggtgcgga | cgaggacgcc | 8760 |
| cggatccggc | tcccgttctc | cttcagcggg | gtcgtctctg | actcggtcgg | cgcgggctcg | 8820 |
| ttgcgcgtac | ggctcgcccc | ggccgggtcc | ggcgcggtgt | cgctcgcggc | cttcgacgag | 8880 |
| cagggcgcac | cggtcgtgtc | ggtggaatca | ctgctgctgc | gggcgggtgga | tccggcacgg | 8940 |

| | | | | | | |
|------------|------------|------------|-------------|-------------|------------|-------|
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| ctggccgcgg | gcccgcgtac | ggacaacgcc | cccggggacg | gcggccggtg | ggccgtggtc | 9060 |
| ggggccgact | cgctcggcct | tgaggccggg | ctgcggggcg | acggcgtcgc | cgtcgacggg | 9120 |
| tacgcggacc | tgtccgcgct | cgccggagtc | gtggccgcgg | gcaagccgca | gccggacacg | 9180 |
| gtgctggtct | cgtacgcctc | ctcgggtccc | ggcatcagga | cggcggacgc | cgttcggcag | 9240 |
| gcggctcacg | acgcgctgga | gctggtccag | ggctggctcg | ccgaggagtc | gctcgccggg | 9300 |
| tcacgactgg | tcgtggtcac | ccgcggcgcg | gtcgaggcgc | ggcccggcga | gggcgtgccc | 9360 |
| gatctggcgc | acgcggcggt | gtggggcctg | ctgcgggtccg | cgcagtccga | gaaccccggg | 9420 |
| cggttcgtac | tgctcgacct | cgacgcggaa | gacgcggagg | tcctggctcc | gctgatggcc | 9480 |
| gccgctgtgg | cgagcgggga | accccagctc | gccgcccgcg | agggcgctct | gcatgccgcg | 9540 |
| aggctggcac | gggttcccgc | cgccccacc | gcggtggcg | gcacggagcg | cgcgcccgcc | 9600 |
| ctcgaccccg | acggtacggt | cctcatcacc | ggcggcaccg | gatcgctcgg | cagcctgctg | 9660 |
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| gccgccgccg | agggcgcccc | ggaactcgtc | gccgcactgg | ccgaactggg | cgccgaggcg | 9780 |
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| ctggcgctgc | tcagcccgga | gcggatcgac | acggtgctgc | gtcccaaggc | cgacgcggcg | 9960 |
| ctgcatctgc | acgagctgac | ccgcgggctg | gacctcgccg | cgttcgtcct | gttctcctcc | 10020 |
| gcggccggaa | ccctcgga | ccccggccag | gccaactacg | cggcggccaa | cgccttcctg | 10080 |
| gacgccttg | cacagcacgc | gcgcgcggcg | gggctgccc | cgggtgctgct | ggcctggggg | 10140 |
| ctgtgggagc | agcgcagcgc | gatgaccgga | gcgctgtcgg | acgcggacgt | ccagcggatg | 10200 |
| gcacgcgccg | gactcgcgcc | cctctcctcg | gcggagggcc | tggccctctt | cgacacggcg | 10260 |
| tgcgccctcg | cgccggtggg | cgccacggag | accgccaccg | gcgacggagc | gttcgctgcc | 10320 |
| atgcggctgg | acaccgcgcc | cctgcggggc | caggcggacg | ccggagccct | tccggcggtc | 10380 |
| ttccgcgggc | tgggtgcgcg | aggctcctcg | agggccgcgg | cacatcaggc | cgccgattcg | 10440 |
| gcggcatcca | ctgccgcgcg | aaagctcgcg | ggcctgtccg | ggctgccgca | ggacgagcag | 10500 |
| gagcgcgtgc | tgctcgacct | ggtgcgcgcc | caggtggccg | ccgtactcgc | ctatccgtcg | 10560 |
| ccggacgcgg | tgggggagtc | gcaggagttc | ctggagctgg | gtctggactc | gctgaccgcc | 10620 |
| gtcgagctgc | gcaaccagct | gaacgcggcg | accggcctgc | ggctgcccgc | caccctgctc | 10680 |
| ttcgaccacc | ccactcccgc | gctggtcgcc | gagcggctgc | gcgccgaact | cgccggagcc | 10740 |

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<210> 39
 <211> 338
 <212> PRT
 <213> Streptomyces aizunensis
 <400> 39

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Thr | Thr | Ser | Asp | Ser | Arg | Ser | Asp | Ser | Arg | Ser | Gly | Ser | Asp | Ser |
| 1 | | | 5 | | | | | 10 | | | | | 15 | | |
| Gly | Phe | Asn | Ser | Gly | Phe | Asp | Ser | Glu | Gln | Thr | Pro | Ser | Thr | Glu | Thr |
| | | 20 | | | | | | 25 | | | | | 30 | | |
| Ala | Ile | Val | Phe | Pro | Gly | Met | Gly | Pro | Ser | Ser | Phe | Ala | Glu | Val | Gly |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Lys | Phe | Leu | Leu | Leu | Asp | Pro | Tyr | Ala | Arg | Arg | Arg | Leu | Ala | Glu | Ala |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Asp | Glu | Ala | Leu | Gly | Tyr | Ser | Val | Phe | Asp | Arg | Phe | Arg | Thr | Ser | Glu |
| 65 | | | | | 70 | | | | | 75 | | | | 80 | |
| Asp | Asp | Tyr | Ser | Val | Tyr | Ser | Gln | Ile | Ala | Phe | Leu | Val | Asn | Ser | Met |
| | | | 85 | | | | | 90 | | | | | | 95 | |
| Ala | Met | Ala | Asp | Arg | Ala | Val | Asp | Ala | Leu | Gly | Ile | Ser | Pro | Thr | Val |
| | | | 100 | | | | | 105 | | | | | 110 | | |

Cys Ala Gly Pro Ser Phe Gly Gln Lys Ala Ala Ser Ala Phe Val Gly
 115 120 125
 Ser Leu Pro Phe Ala Asp Val Val Arg Leu Thr Ala Glu Leu Ala Arg
 130 135 140
 Cys Glu Glu Glu Tyr Phe Ala Asp Ala Tyr Gln Asp Val Val Thr His
 145 150 155 160
 Cys Phe Val Arg Thr Pro Gln Asp Arg Leu Asp Glu Ile Leu Ala Gly
 165 170 175
 Phe Asp Asp Arg Gly Ala Trp Tyr Asp Ile Ser Gly Arg Leu Asp Ala
 180 185 190
 Ala Phe His Met Val Ser Val Gln Glu Lys Glu Leu Asp Gly Leu Lys
 195 200 205
 Ala Gly Ile Ser Ala Val Gly Gly Tyr Ser Met Tyr Ser Met Arg Pro
 210 215 220
 Pro Val His Ala Ala Ala Phe Ser Ala Leu Arg Arg Lys Ala Glu Glu
 225 230 235 240
 Glu Val Phe Ala Ala Tyr Glu Leu Ala Asp Pro Thr Leu Pro Val Val
 245 250 255
 Asn Asp Gln Asp Gly Gly Val Val Arg Asp Ala Ala Gly Met Arg Thr
 260 265 270
 Met Met Leu Asp Thr Phe Asp Arg Pro Val His Trp Pro Gly Val Val
 275 280 285
 Glu Ser Leu Lys Gly Leu Gly Val Gly Thr Val Cys Val Thr Gly Pro
 290 295 300
 Asp Asn Leu Phe His Arg Leu Asp Leu Thr Lys Asp Ser Phe Glu Val
 305 310 315 320
 Val Thr Val Gly Leu Pro Lys Lys Arg Ser Arg Glu Arg Glu Lys Arg
 325 330 335

Val Ala

<210> 40
 <211> 1017
 <212> DNA
 <213> Streptomyces aizunensis

 <400> 40
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 ccctcgtcct tcgcggaggt cggaaagttc ctgctgctcg acccttacgc gcgccggcgc 180
 ctgcgggagg cagacgaggc gtcggatat tcggtgttcg accgtttccg cacctccgag 240
 gacgactact cgggtctattc gcagatcgcc ttcttggtga attcgatggc tatggccgac 300

cgggcggtgg acgcgctcgg catctctccc accgtctgcg ccggcccagag tttcggccag 360
 aaggccgcct ccgctttcgt cgggtcgtcg cccttcgcgg acgtcgtccg gctcaccgcg 420
 gagctggccc gctgcgagga ggagtacttc gccgacgcgt accaggacgt cgtcacgcac 480
 tgcttcgtcc gcaccccgca ggaccggctg gacgagatcc tggccggctt cgacgaccgc 540
 ggtgcctggg acgacatctc cgggcggtcg gacgccgctt tccacatggg gtccgtacag 600
 gagaaggagc tggacgggct gaaggcgggc atcagcgcgg tcggcggcta ctccatgtac 660
 tcgatgcgcc cgcccgtaga cgcgggcgcc ttctcggcgc tgcgccgcaa ggcggaggaa 720
 gaggtcttcg ccgcgtacga actggccgac cccaccctgc ccgtgggtcaa cgaccaggac 780
 ggcgggggtcg tccgggacgc cgccgggatg cgcacgatga tgctggacac cttcgaccgg 840
 cccgtccact ggccgggctg ggtggagtcc ctcaaggggc tcggcgtggg cacggtgtgc 900
 gtgaccgggc ccgacaacct cttccaccgc ctcgacctca ccaaggacag cttcgaggtc 960
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<210> 41
 <211> 283
 <212> PRT
 <213> Streptomyces aizunensis
 <400> 41

Met Thr Ala Thr Leu Thr Ala Pro Asp Pro Val Thr Asp Phe Pro Ala
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 Glu Leu Arg Pro Ala Arg Thr Asp Val Arg Thr Ala Thr Arg Thr Phe
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 Phe Phe Ile Leu Trp Arg Asp Ile Phe Val Thr Gly Arg Glu Leu Gly
 35 40 45
 Pro Phe Leu Ala Gln Val Leu Val Glu Pro Phe Phe Ile Leu Phe Val
 50 55 60
 Phe Gly Lys Val Leu Gly Glu Leu Gly Tyr Thr Gly Gly Gly Phe Gln
 65 70 75 80
 Gln Ile Leu Leu Pro Gly Val Val Ala Leu Asn Ser Phe Leu Val Ser
 85 90 95
 Leu Gln Asn Thr Ala Leu Pro Leu Val Ile Asp Phe Ser Trp Thr Lys
 100 105 110
 Glu Ile Glu Asp Arg Leu Leu Ala Pro Ile Pro Thr Ser Leu Val Ala
 115 120 125
 Val Glu Lys Leu Val Phe Gly Ala Leu Arg Gly Ile Ile Ala Ser Leu
 130 135 140

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Met | Ile | Pro | Val | Gly | Phe | Leu | Ile | Leu | Asp | Asp | Val | Ser | Trp | Pro |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Met | Asp | Ser | Phe | Leu | Pro | Thr | Leu | Gly | Val | Leu | Leu | Thr | Gly | Ala | Leu |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Ala | Gly | Ser | Thr | Val | Gly | Leu | Thr | Ile | Gly | Thr | Leu | Ala | Pro | Pro | Arg |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| His | Ile | Ser | Val | Ile | Phe | Ala | Val | Thr | Leu | Thr | Pro | Leu | Met | Phe | Thr |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Gly | Cys | Thr | Gln | Phe | Pro | Trp | His | Ser | Leu | Ala | Asp | Ile | Arg | Trp | Phe |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Gln | Val | Leu | Cys | Ala | Ile | Asn | Pro | Leu | Thr | Tyr | Val | Ser | Glu | Gly | Ile |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Arg | Ala | Leu | Leu | Leu | Pro | Pro | Gly | Gly | Pro | Gly | Ser | Ile | Pro | Leu | Trp |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Ile | Asp | Leu | Leu | Ala | Leu | Ser | Gly | Ala | Ile | Val | Val | Phe | Gly | Leu | Ile |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Gly | Ile | Lys | Gly | Phe | His | Arg | Arg | Ala | Gln | Asp | | | | | |
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<210> 42
 <211> 852
 <212> DNA
 <213> Streptomyces aizunensis

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| gcgcgcaccg acgtgcgcac cgcgaccgc acgttcttct tcatcctgtg gcgggacatc | 120 |
| ttcgtcaccg gccgcgaact gggcccgttc ctgcgccagg tgctcgtgga accgttcttc | 180 |
| atcctgttcg tcttcggcaa ggtcctcggc gaactcgggt acaccggcgg cgggttccag | 240 |
| cagatcctgc tcccgggcgt ggtcgcgctc aacagcttcc tggtcagcct gcagaacacc | 300 |
| gcgctgcccc tggtcacga cttctcctgg accaaggaga tcgaggaccg gtcctcgcg | 360 |
| cccatcccca ccagcctggt ggccgtcgag aagctggtct tcggggcgct gcgcggcatc | 420 |
| atgcctcac tggatgatgat ccccgctcggc ttctgatcc tcgacgacgt gtcctggccg | 480 |
| atggacagct tctgcccac gctgggcgtg ctgctgacgg gcgcgctggc gggcagcacg | 540 |
| gtgggtctga ccatcggcac gctggccccg ccgcggcaca tcagcgtcat cttcgccgtg | 600 |
| acgctgacct cgctgatgtt caccggctgc acccagttcc cctggcacag cctggcggac | 660 |
| atccgctggt tccaggtgct gtgcgccatc aaccgctga cctacgtcag cgaggggatc | 720 |
| cgcgccctgc tgctgccgcc gggcggcccc ggctcgattc cgctgtggat cgatctgctc | 780 |
| gccctgagcg gggcgatcgt ggtcttcggg ctgatcggca tcaaggggtt ccaccgcagg | 840 |

<210> 43

<211> 329

<212> PRT

<213> Streptomyces aizunensis

<400> 43

Val Asp Ser Ala Val Val Val Asp Gly Leu Val Lys Lys Tyr Arg Ser
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Glu Val Phe Gly Phe Leu Gly Pro Asn Gly Ala Gly Lys Thr Thr Thr
35 40 45

Ile Gly Ile Leu Thr Thr Arg Val Ala Pro Thr Ala Gly Arg Ala Phe
50 55 60

Val Gln Gly Val Asp Val Val Ala His Pro Ala Gln Ala Arg Arg Ala
65 70 75 80

Phe Ala Val Val Pro Gln Arg Asn Asn Leu Asp Arg Ser Leu Thr Leu
85 90 95

Arg Gln Asn Leu Thr Phe His Ala Gly Tyr His Gly Met Ser Arg Ser
100 105 110

Glu Arg Gly Arg Leu Ala Asp Glu Cys Leu Glu Trp Val Gly Leu Ala
115 120 125

Asp Arg Gly Lys Ala Arg Gly Asp Glu Leu Ser Gly Gly Gln Ala Gln
130 135 140

Arg Val Met Ile Ala Arg Ala Leu Met His Arg Pro Asp Val Leu Phe
145 150 155 160

Leu Asp Glu Pro Ala Thr Gly Leu Asp Pro Gln Ala Arg Leu Phe Ile
165 170 175

His Glu Arg Val Ala Glu Leu Ser Lys Arg Gly Val Thr Thr Val Leu
180 185 190

Thr Thr His Asp Met Asp Glu Ala Ala Lys Leu Cys Asp Arg Val Gly
195 200 205

Ile Val Asp His Gly Arg Leu Leu Ala Leu Asp Thr Pro Gln Ala Leu
210 215 220

Thr Arg Ser Leu Ser Ser Thr Ala Leu Thr Leu Thr Val Gln Pro Ala
225 230 235 240

Gly His Asp Ala Glu Ser Val Val Arg Leu Leu Glu Arg Ile Glu Thr
245 250 255

Val Glu Arg Val Glu Leu Ala His Gln Glu His Ala Lys Glu Gln Gly

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 260 | | 265 | | 270 | | | | | | | | | | |
| Gly | Ala | Pro | Ala | Pro | Val | Arg | Leu | Arg | Leu | Tyr | Ser | Asp | Ala | Pro | Ser |
| | 275 | | | | | | 280 | | | | | 285 | | | |
| Gly | Ala | Val | Leu | Pro | Thr | Ala | Ile | Thr | Ala | Leu | Thr | Glu | Ala | Ser | His |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Asp | Ile | Lys | Asp | Val | Ser | Val | Gly | Thr | Ala | Thr | Leu | Glu | Asp | Val | Phe |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Ile | Lys | Leu | Thr | Gly | Arg | Glu | Leu | Arg | | | | | | | |
| | | | | 325 | | | | | | | | | | | |

<210> 44
 <211> 990
 <212> DNA
 <213> Streptomyces aizunensis

<400> 44
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 aacggggcgg gcaagacgac gaccatcggc atcctcacca cccgctggc cccacggcg 180
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 ttgcgcgtcg taccgcagcg caacaacctc gaccggctgc tgacctccg gcagaacctg 300
 accttccacg ccggctatca cggcatgagc cgctccgaac gcggacggct cgccgacgag 360
 tgcttgaggt ggggtgggtct cgccgaccgg ggcaaggccc gcggcgacga actctccggc 420
 ggccaggccc agcgcgtgat gatcgcccgg gccctgatgc accgccccga cgtgctcttc 480
 ctcgacgagc ccgccaccgg actcgatccg caggcacggc tgttcatcca cgagcgcgtg 540
 gccgagctga gcaagcgcg ggtgaccacc gtgctgacca cgcacgacat ggacgaagcc 600
 gccaaactct gcgaccgct cggcatcgtc gaccacggcc gactgctggc cctcgacacc 660
 ccgcaggcgc tgaccggag cctgagcagc accgcctca ccctaccgt ccagcccgcg 720
 gggcacgacg ccgagagcgt cgtacgcctg ctggagcgga tcgagacggt cgagcgggtc 780
 gagctggcac accaggaaca cgccaaggag caggggcgcg cgcccgcgc ggtacggctc 840
 cgcctctaca gcgacgcgcc gtccggcgcg gtgctgccga ccgccatcac ggccctgacg 900
 gaagcgagtc acgacatcaa ggacgtgagc gtcggaaccg cgaccctgga ggacgtcttc 960
 atcaagctca ccggccggga gctgcatga 990

<210> 45
 <211> 317
 <212> PRT
 <213> Streptomyces aizunensis

<400> 45

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Ser | Ala | Gly | Phe | Gly | Val | Glu | Pro | Gly | Ser | Leu | Arg | Trp | Met | Val | 1 | 5 | 10 | 15 |
| Ile | Gly | Ala | Thr | Gly | Met | Leu | Gly | Gly | Glu | Val | Ala | Ala | Gln | Leu | Thr | 20 | 25 | 30 | |
| Ala | Arg | Gly | Ala | Asp | Pro | Val | Gly | Val | Gly | Ser | Ala | Asp | Leu | Asp | Leu | 35 | 40 | 45 | |
| Thr | Asp | Pro | Gln | Ala | Val | Ala | Ala | Ala | Val | Ala | Asp | Gly | Gly | Pro | Asp | 50 | 55 | 60 | |
| Val | Val | Val | Asn | Cys | Ala | Ala | Trp | Thr | Ala | Val | Asp | Leu | Ala | Glu | Thr | 65 | 70 | 75 | 80 |
| Glu | Glu | Glu | Ala | Ala | Leu | Ala | Val | Asn | Gly | Thr | Gly | Ala | Gly | His | Leu | 85 | 90 | 95 | |
| Ala | Arg | Ala | Cys | Ala | Ala | Thr | Gly | Ser | Arg | Leu | Leu | His | Val | Ser | Thr | 100 | 105 | 110 | |
| Asp | Tyr | Val | Phe | Arg | Gly | Ala | Pro | Ala | Asp | Ala | Gly | His | Pro | Tyr | Ala | 115 | 120 | 125 | |
| Glu | Asp | Ala | Glu | Pro | Asp | Pro | Ala | Thr | Ala | Tyr | Gly | Arg | Thr | Lys | Leu | 130 | 135 | 140 | |
| Val | Gly | Glu | Arg | Ala | Val | Leu | Ala | Glu | Leu | Pro | Ala | Thr | Ala | Ala | Val | 145 | 150 | 155 | 160 |
| Val | Arg | Thr | Ser | Trp | Leu | Tyr | Gly | Arg | Asp | Asn | Gly | Gly | Phe | Val | His | 165 | 170 | 175 | |
| Thr | Met | Ala | Arg | Leu | Ala | Arg | Glu | Pro | Gly | Arg | Thr | Val | Asp | Val | Val | 180 | 185 | 190 | |
| Asp | Asp | Gln | His | Gly | Gln | Pro | Ser | Trp | Thr | Pro | Asp | Val | Ala | Ala | Arg | 195 | 200 | 205 | |
| Ile | Ile | Glu | Leu | Ala | Ala | Leu | Pro | Ala | Asp | Arg | Ala | His | Gly | Val | Phe | 210 | 215 | 220 | |
| His | Ala | Thr | Gly | Gly | Gly | Arg | Thr | Thr | Trp | Tyr | Asp | Leu | Ala | Arg | Glu | 225 | 230 | 235 | 240 |
| Val | Phe | Arg | Leu | Thr | Gly | Gln | Asp | Pro | Asp | Arg | Val | Arg | Arg | Ile | Asp | 245 | 250 | 255 | |
| Ser | Ser | Gly | Leu | Arg | Arg | Ala | Ala | Val | Arg | Pro | Ala | Trp | Ser | Val | Leu | 260 | 265 | 270 | |
| Gly | His | Asp | Arg | Trp | Ala | Ala | Thr | Gly | Leu | Ala | Pro | Met | Arg | His | Trp | 275 | 280 | 285 | |
| Arg | Thr | Ala | Leu | Ala | Asp | Ala | Leu | Met | Gly | Asp | Pro | Val | Gly | Asp | Arg | 290 | 295 | 300 | |
| Leu | Pro | Glu | Ser | Val | Asn | Ser | Pro | Gly | Pro | Lys | Gly | Cys | | | | | | | |

305

310

315

<210> 46

<211> 954

<212> DNA

<213> *Streptomyces aizunensis*

<400> 46

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ggcatgctcg gcggcggaagt ggccgcccag ctcacggccc ggggcgccga cccggtgggg      120
gtcggcagtg cggatctgga cctcaccgac ccgcaggcgg tcgccgcggc cgtggccgac      180
ggcggccccc atgtcgtcgt caactgcgcc gcctggaccg ccgtggacct ggccgagacc      240
gaggaggagg cggccctcgc cgtcaacggg acgggagcgg gccacctcgc ccgggcctgc      300
gccgccaccg gcagccggct cctccacgtc tccaccgact acgtcttcgc aggtgccccg      360
gccgatgccg gacacccta tgccgaggac gccgaacccg accccgccac cgcgtaggga      420
cgcaccaagc tcgtcggcga gcgcgccgtc ctcgccgaac tccccgccac cgctgccgtg      480
gtgcgcacgt cctgggtgta cggacgcgac aacggcggct tcgtgcacac catggcccgg      540
ctcgcgcgcg agccgggacg caccgtggac gtggtcgacg accagcacgg acagccgagc      600
tggacccccg atgtcgcggc ccggatcatc gagctcgccg ccctgccgcg cgaccgggcg      660
cacggcgtct tccatgccac cggcgggggc cgcaccacct ggtacgacct ggcccgcgag      720
gtgttcgggc tgaccggcca ggacccggac cgggtccggc gcatcgacag ctccgggctg      780
cgacgggchg cggtcgcccc ggcatggagc gttctggggc atgaccgctg ggccgccacg      840
gggctcgccc cgatgcgtca ctggcgcacg gccctcgchg acgccctcat gggcgacccc      900
gtgggcgacc gacttcccga gagtgtgaac tccccgggcc cgaaaggctg ttga      954

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<210> 47

<211> 204

<212> PRT

<213> *Streptomyces aizunensis*

<400> 47

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Val Lys Ser Leu Ser Ile Glu Gly Ala Trp Leu Tyr Glu Pro Leu Leu
1           5           10           15

His Asp Asp Glu Arg Gly Thr Phe Leu Glu Val Phe Gln Ser Gln Ala
          20           25           30

Phe Glu Leu Ala Thr Gly Arg Arg Leu Glu Leu Ala Gln Val Asn Cys
          35           40           45

Ser Val Ser Arg Arg Gly Val Val Arg Gly Val His Phe Ala Asp Leu
          50           55           60

```

Pro Pro Gly Gln Ala Lys Tyr Val Thr Cys Val Arg Gly Ala Val Arg
 65 70 75 80
 Asp Val Ile Val Asp Leu Arg Thr Gly Ser Pro Thr Tyr Arg Ala Trp
 85 90 95
 Glu Ala Val Glu Leu Asp Asp Arg Asp Arg Arg Ala Val Phe Leu Ser
 100 105 110
 Glu Gly Leu Gly His Ala Phe Gln Ala Ile Thr Asp Asp Ala Thr Val
 115 120 125
 Val Tyr Leu Thr Thr Ser Gly Tyr Ala Pro Gly Arg Glu His Gly Val
 130 135 140
 His Pro Leu Asp Pro Glu Leu Gly Ile Thr Trp Leu Pro Gly Met Glu
 145 150 155 160
 Pro Leu Leu Ser Pro Lys Asp Ala Val Ala Pro Thr Leu Ala Val Ala
 165 170 175
 Glu Ala Gln Gly Leu Leu Pro Ala Tyr Glu Asp Cys Val Arg Tyr Val
 180 185 190
 Ser Ser Leu Ala Thr Pro Leu Ser Glu Glu Thr Pro
 195 200

<210> 48
 <211> 615
 <212> DNA
 <213> Streptomyces aizunensis

<400> 48
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 cgcggcacgt tcctggaggt gttccagagc caggccttcg agctggccac cggccgcccgc 120
 ctcgaactgg cccaggtcaa ctgctccgtg tcccgcgcgcg gcgtcgtgcg cggcgtccac 180
 ttcgccgact taccgcccgg ccaggccaag tacgtcacct gcgtacgcgg cgcggtgcg 240
 gatgtgatcg tggacctgcg caccggctcg cccacctacc gcgcctggga ggccgtcgaa 300
 ctcgacgacc gcgaccggcg ggcggtcttc ctctccgagg gcctcggcca cgccttcag 360
 gcgatcaccg acgacgccac cgtcgtctac ctgaccacct cgggctacgc ccccgccgt 420
 gagcacggcg tccacccgct cgaccggag ctgggcatca cctggcttcc cggcatggaa 480
 ccgctgctgt ccccgaagga cgctgtcgcc cccacctcg cgggtggcca ggcccagggt 540
 ctgctgcccg cgtacgagga ctgcgtacgg tacgtgtcct cgctcgccac accactcagc 600
 gaggagaccc cgtga 615

<210> 49
 <211> 328
 <212> PRT
 <213> Streptomyces aizunensis

<400> 49

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Val | Ala | Asn | Lys | Pro | Ile | Leu | Phe | Tyr | Val | Leu | Glu | Gly | Ile | Ala | Asp | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |
| Ala | Gly | Val | Thr | Asp | Val | Gly | Ile | Ile | Val | Gly | Asp | Thr | Ala | Asp | Glu | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |
| Ile | Arg | Ala | Ala | Val | Gly | Asp | Gly | Ser | Arg | Phe | Gly | Ile | Ser | Val | Thr | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |
| Tyr | Ile | Pro | Gln | His | Gln | Pro | Leu | Gly | Leu | Ala | His | Ala | Val | Arg | Ile | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |
| Ala | Arg | Asp | Trp | Leu | Gly | Glu | Asp | Asp | Phe | Val | Met | Tyr | Leu | Gly | Asp | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |
| Asn | Phe | Leu | Leu | Gly | Gly | Ile | Ser | Glu | Gln | Leu | Glu | Glu | Phe | Arg | Thr | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |
| Arg | Arg | Pro | Ala | Ala | Gln | Ile | Met | Leu | Thr | Arg | Val | Pro | Asp | Pro | Ser | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| Ala | Phe | Gly | Val | Val | Thr | Leu | Asp | Glu | Ala | Gly | Arg | Val | Thr | Gly | Leu | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| Glu | Glu | Lys | Pro | Lys | Phe | Pro | Lys | Ser | Asp | Leu | Ala | Leu | Val | Gly | Val | |
| | 130 | | | | | 135 | | | | | 140 | | | | | |
| Tyr | Phe | Phe | Thr | Ala | Ala | Val | His | Asp | Ala | Val | Asp | Ala | Ile | Gln | Pro | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |
| Ser | Ala | Arg | Gly | Glu | Leu | Glu | Ile | Thr | Glu | Ala | Leu | Gln | Trp | Leu | Leu | |
| | | | | 165 | | | | | 170 | | | | | 175 | | |
| Asp | Lys | Gly | Leu | Gly | Ile | Ala | Ser | Ser | Thr | Val | Asn | Gly | Tyr | Trp | Lys | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Asp | Thr | Gly | Asn | Ala | Thr | Asp | Met | Leu | Glu | Val | Asn | Arg | Thr | Val | Leu | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| Asp | Arg | Leu | Thr | Pro | Tyr | Cys | Asp | Gly | Ser | Val | Asp | Gly | Glu | Ser | Glu | |
| | 210 | | | | | 215 | | | | | 220 | | | | | |
| Leu | Val | Gly | Arg | Val | Val | Val | Glu | Asp | Gly | Ala | Val | Ile | Thr | Arg | Ser | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | |
| Arg | Ile | Val | Gly | Pro | Ala | Ile | Ile | Gly | Arg | Gly | Thr | Arg | Val | Glu | Gly | |
| | | | | 245 | | | | | 250 | | | | | 255 | | |
| Ser | Tyr | Ile | Gly | Pro | Phe | Thr | Ser | Val | Gly | Ala | Asp | Cys | Val | Val | Val | |
| | | | 260 | | | | | 265 | | | | | 270 | | | |
| Asp | Ser | Glu | Ile | Glu | Tyr | Ser | Ile | Val | Leu | Ala | Gly | Ala | Ala | Ile | Asp | |
| | | 275 | | | | | 280 | | | | | 285 | | | | |
| Gly | Val | Gly | Arg | Ile | Glu | Ala | Ser | Met | Ile | Gly | Arg | Gln | Ala | Gln | Val | |
| | 290 | | | | | 295 | | | | | 300 | | | | | |

Thr Pro Ala Pro Arg Thr Pro Gln Ala His Arg Leu Ile Leu Gly Asp
 305 310 315 320

His Ser Lys Val Gln Ile Arg Ser
 325

<210> 50
 <211> 987
 <212> DNA
 <213> Streptomyces aizunensis

<400> 50
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 gatgtcggca tcatcgtcgg cgacacggcc gacgagatca gggcggccgt cggcgacggc 120
 tcccgtttcg gcatcagcgt cacctacatc ccgcagcacc agccgctcgg cctggcccac 180
 gccgtgcgca tcgcacggga ctggctcggc gaggacgact tcgtgatgta cctgggcgac 240
 aacttcctgc tcggcgggat cagcgagcag ctggaggagt tccgcacccg gcggcccgcc 300
 gcgcagatca tgctacccg ggtccccgat cctccgcct tcggcgctcg caccctcgac 360
 gaggcgggcc gggtcaccgg cctggaggag aagccgaagt tccccaagag cgatctcgcg 420
 ctggctcggcg tgtacttctt caccgccgcc gtgcacgacg ccgtggacgc catccagccc 480
 tccgcccgcg gcgagctgga gatcaccgag gccctccagt ggctcctcga caagggcctc 540
 ggcacgcgct cctccacggg caacggctac tggaaggaca ccggcaacgc caccgacatg 600
 ctggagggtca accgcacggg gctcgacagg ctgaccccgt actgcgacgg ctccgctcgac 660
 ggcgagagcg aactggtcgg ccgggtcgtc gtcgaggacg gcgcggtgat caccgctcc 720
 cggatcgtgg gccccgccat catcggccgc ggcacccgcg tcgagggctc ctacatcggc 780
 ccgttcacct ccgtcggggc ggactgctg gtcgtcgaca gcgagatcga gtactccatc 840
 gtgctggccg gcgcggccat cgacggcgtc ggccggatcg aggcgtccat gatcggccgt 900
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 cacagcaagg tgcagatccg ttcatga 987

<210> 51
 <211> 328
 <212> PRT
 <213> Streptomyces aizunensis

<400> 51

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 1 5 10 15

Val Arg Thr Ile Leu Gly Pro Asp Lys Pro Leu Gly Asp Asp Val Arg
 20 25 30

Val Thr Val Leu Asp Ala Leu Thr Tyr Ala Gly Asn Arg Ala Ser Leu
35 40 45
Ala Ala Val Glu Asp Glu Pro Gly Phe Thr Phe Val His Gly Asp Ile
50 55 60
Thr Asp Ala Leu Leu Val Asp Arg Leu Val Ala Ala His Asp Ala Val
65 70 75 80
Val His Leu Ala Ala Glu Ser His Val Asp Arg Ser Ile Trp Arg Ala
85 90 95
Asp Ala Phe Val Arg Thr Asn Val Leu Gly Thr His Thr Leu Leu Glu
100 105 110
Ala Ala Leu Arg His Gly Thr Gly Pro Phe Val His Val Ser Thr Asp
115 120 125
Glu Val Tyr Gly Ser Val Pro Val Gly Ser Ser Val Glu Ser Asp Pro
130 135 140
Leu Thr Pro Ser Ser Pro Tyr Ser Ala Ser Lys Ala Ser Ser Asp Leu
145 150 155 160
Leu Ala Leu Ala Tyr His His Thr His Gly Leu Asp Val Arg Val Thr
165 170 175
Arg Cys Ser Asn Asn Tyr Gly Pro Tyr Gln His Pro Glu Lys Val Ile
180 185 190
Pro Leu Phe Val Thr Arg Leu Leu Ser Gly Ala Ala Val Pro Leu Tyr
195 200 205
Gly Asp Gly Gly Asn Val Arg Asp Trp Leu His Val Asp Asp His Cys
210 215 220
Arg Ala Leu Leu Ala Val Leu Thr Asp Gly Arg Ala Gly His Thr Tyr
225 230 235 240
Asn Ile Gly Gly Gly Thr Glu Leu Thr Asn Lys Glu Leu Thr Gly Leu
245 250 255
Leu Leu Asp Ala Cys Gly Ala Gly Trp Asp Arg Val Glu His Val Thr
260 265 270
Asp Arg Lys Gly His Asp Arg Arg Tyr Ser Val Asp Trp Thr Lys Ile
275 280 285
Arg Thr Glu Leu Gly Tyr Thr Pro Ala His Asp Phe Ala Glu Gly Leu
290 295 300
Ala Glu Thr Val Ala Trp Tyr Arg Thr Asn Arg Pro Phe Trp Ala Ala
305 310 315 320
Pro Gly Ala Glu Leu Gln Gly Ala
325

<210> 52
<211> 987
<212> DNA

<213> Streptomyces aizunensis

<400> 52

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tacgcgggca accgcgcctc cctcgccgcc gtcgaggacg aaccgggctt caccttcgtg    180
cacggcgaca tcaccgacgc gctgctgggtg gaccgcctgg tggcggccca cgacgccgtg    240
gtgcacctgg ccgccgagtc gcacgtcgac cgttcgatct ggcgggccga cgcgttcgta    300
cgcaccaatg tgctcggcac ccacaccctg ctggaggccg cgctgcggca cggcaccggc    360
ccgttcgtgc acgtgtcgac cgacgaggtg tacggctcgg tcccggtcgg ctcgtccgtc    420
gagagcgacc cgctgacgcc cagctcgccc tactccgctt ccaaggcgtc cagtgatctg    480
ctggccctgg cctaccacca caccacgga ctcgacgtgc gggtgacgcg ctgctccaac    540
aactacgggc cctaccagca cccggagaag gtgatccgc tcttcgtcac ccggctgctc    600
agtggcgccg ccgtcccgtc ctacggcgac ggcgggaacg tacgcgactg gctgcacgtc    660
gacgaccact gccgcgctct gctggccgtc ctcaccgacg ggcgcgcggg gcacacgtac    720
aacatcggcg gcggcaccga gtcaccaac aaggagctga ccggcctgct gctggacgcc    780
tgcgggcgccg gatgggaccg ggtcgagcac gtcaccgacc gcaagggcca cgaccgccgg    840
tactccgtcg actggacgaa gatccgcacc gagctgggct acacccccgc gcacgacttc    900
gccgagggcc tcgccgagac cgtcgccctgg tacagaacca accgcccgtt ctgggcagcg    960
cccggggcgg agcttcaggg cgcata      987
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<210> 53

<211> 214

<212> PRT

<213> Streptomyces aizunensis

<400> 53

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Asp Val Ser Leu Ile Gln Ile Arg Gln Pro Ala Ile Pro Ser Ser Tyr
          20          25          30
Arg Met Ile Cys Phe Pro Ser Ser Arg Asn Ser Ser Ile Cys Tyr Leu
          35          40          45
Ala Met Ser Glu Leu Leu Leu Pro Thr Val Glu Leu Leu Ile Val Gln
          50          55          60
Tyr Pro Ala Leu Thr Ser Glu Glu Glu His Ser Ala Glu Glu Asp Ala
65          70          75          80
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Ala Leu Ala Asp Lys Ile Phe Glu Ala Val Arg Gly Trp Ala Asp Arg
85 90 95

Pro Leu Ala Leu Phe Gly His Arg Leu Gly Ala Glu Leu Ala Tyr Ala
100 105 110

Val Ala Gln Arg Leu Glu Arg Glu Thr Asp Ala Ala Pro Leu Thr Leu
115 120 125

Phe Val Ser Gly Arg Thr Gly Pro Gly His Arg Gly Ser Leu Gly Pro
130 135 140

Pro Ala Leu Asn Cys Arg Val Val Ala Leu Ala Gly Tyr His Asp Pro
145 150 155 160

Arg Ala Pro Leu Ala Gly Val Arg Ala Trp Arg Arg Cys Thr Ala Gly
165 170 175

Arg Phe Asp Leu Glu Val Phe Pro Gly Thr Arg Gly Tyr Leu Asp Ser
180 185 190

His Arg Arg Glu Val Val Asn Leu Val His Asp Gln Leu Ile Ser Leu
195 200 205

Arg Gly Pro Glu Pro Asp
210

<210> 54
<211> 645
<212> DNA
<213> Streptomyces aizunensis

<400> 54
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atccagatcc ggcagccggc gatcccgagc agctaccgca tgatctgttt cccagttcg 120

cggaactcct cgatctgcta tctggccatg tcggaactgc tgctgccac cgtggaactg 180

ctcatcgctc agtaccggc cctgacctcc gaggaggagc attcgccga ggaggacgcg 240

gcgctcgccg acaagatctt cgaagcggtc cggggctggg ccgaccgcc gctcgccctc 300

ttcgggcacc gcctcggtgc cgaactcgcc tacgcggtcg cccagcggct ggaacgggag 360

accgacgcg gacccctgac cctgttcgct tccggacgca cgggaccggg ccaccgcggc 420

agcctcgcc cgcccgct caactgccg gtcgtcgccc tggccgggta ccacgacccc 480

cgcgacccc tggccggggt acgggcctgg cggcgctgca cggcgggacg gttcgacctg 540

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gtgcacgacc agctgatttc gctccgcgga ccggagcccc actga 645

<210> 55
<211> 470
<212> PRT
<213> Streptomyces aizunensis

<400> 55

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Arg | Pro | Met | Thr | Ala | Lys | Ile | Phe | Ala | Val | Asp | Ser | Val | Arg | Pro | 1 | 5 | 10 | 15 |
| Ile | Asp | Glu | Phe | Glu | Gln | Asp | Ala | Leu | Arg | Val | Ala | Asp | Val | Ile | Arg | 20 | 25 | 30 | |
| Glu | Arg | Gly | Val | Cys | Leu | Gly | Asp | Arg | Val | Met | Leu | Lys | Ala | Gly | Asn | 35 | 40 | 45 | |
| Ser | Ala | Ser | Tyr | Val | Cys | Val | Leu | Tyr | Ala | Leu | Met | His | Ile | Gly | Ala | 50 | 55 | 60 | |
| Ser | Ile | Val | Leu | Val | Asp | Gln | Gln | Glu | His | Lys | Glu | Glu | Thr | Arg | Arg | 65 | 70 | 75 | 80 |
| Ile | Ala | Leu | Arg | Thr | Gly | Val | Lys | Val | Thr | Phe | Val | Asp | Asp | Glu | Thr | 85 | 90 | 95 | |
| Pro | Ile | Asp | Gln | Asp | Ala | Asp | Pro | Ile | His | Leu | Tyr | Glu | Leu | Met | Val | 100 | 105 | 110 | |
| Ala | Thr | Gln | Asn | Arg | Pro | Pro | Met | Asp | Ser | Ala | Leu | Ser | Phe | Asp | Ala | 115 | 120 | 125 | |
| Trp | Gly | Glu | Leu | Ser | Asp | Gly | Leu | Ile | Met | Trp | Thr | Ser | Gly | Ser | Thr | 130 | 135 | 140 | |
| Gly | Ser | Pro | Lys | Gly | Val | Val | Lys | Ser | Gly | Gly | Lys | Phe | Leu | Ala | Asn | 145 | 150 | 155 | 160 |
| Leu | Arg | Arg | Asn | Ala | His | Gln | Val | Gly | His | Arg | Pro | Asp | Asp | Val | Leu | 165 | 170 | 175 | |
| Met | Pro | Leu | Leu | Pro | Phe | Ala | His | Gln | Tyr | Gly | Leu | Ser | Met | Val | Leu | 180 | 185 | 190 | |
| Ile | Ala | Trp | Leu | Thr | Arg | Cys | Ser | Leu | Val | Ile | Ala | Pro | Tyr | Arg | Arg | 195 | 200 | 205 | |
| Leu | Asp | Arg | Ala | Leu | Arg | Met | Ala | Arg | Asp | Ser | Gly | Thr | Thr | Val | Ile | 210 | 215 | 220 | |
| Asp | Ala | Thr | Pro | Ser | Ser | Tyr | Arg | Ser | Ile | Leu | Gly | Leu | Val | Thr | Arg | 225 | 230 | 235 | 240 |
| Lys | Pro | Ala | Leu | Arg | Ala | His | Leu | Ala | Gly | Thr | Arg | Met | Phe | Cys | Val | 245 | 250 | 255 | |
| Gly | Ala | Ala | Pro | Leu | Asp | Ala | Pro | Leu | Val | Glu | Ser | Tyr | Val | Gln | Glu | 260 | 265 | 270 | |
| Phe | Gly | Leu | Pro | Leu | Leu | Asp | Ser | Tyr | Gly | Ser | Thr | Glu | Leu | Asn | Asn | 275 | 280 | 285 | |
| Ile | Ala | Phe | Ala | Thr | Leu | Asp | Asn | Pro | Val | Ser | Cys | Gly | Arg | Ala | Met | 290 | 295 | 300 | |

Glu Gly Ile Gly Leu Arg Ile Val Asp Glu Asp Gly Arg Glu Val Ala
 305 310 315 320
 Ala Gly Gln Pro Gly Glu Ile Glu Val Asp Thr Pro Asp Ala Leu Glu
 325 330 335
 Gly Gln Ile Ala Glu Asp Gly Ser Ile Ile Pro Ala Pro Thr Gly Trp
 340 345 350
 Gln Arg Thr Gly Asp Leu Gly His Leu Asp Ala Asp Gly Asn Leu Tyr
 355 360 365
 Val Leu Gly Arg Lys Phe Ala Val His Arg Met Gly Tyr Thr Leu Tyr
 370 375 380
 Pro Glu Leu Ile Glu Arg Lys Val Ala Ala Glu Gly Cys Pro Thr Arg
 385 390 395 400
 Ile Val Pro Leu Pro Asp Glu Leu Arg Gly Ser Gln Leu Val Phe Phe
 405 410 415
 Val Glu Asp Asp Glu Gln Arg Asp Ala Gly Tyr Trp Arg Glu Arg Leu
 420 425 430
 Cys Gly Leu Leu Pro Ala Phe Glu Gln Pro Asn Lys Val Val Val Leu
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 Glu Gln Phe Pro Leu Asn Arg Asn Gly Lys Pro Asp Lys Lys Glu Leu
 450 455 460
 Thr Arg Met Ala Ala Glu
 465 470

<210> 56

<211> 1413

<212> DNA

<213> *Streptomyces aizunensis*

<400> 56

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| gagcaggacg ccttccgcgt cgccgatgtg atccgcgaac gcggagtctg tctcggcgac | 120 |
| cgggtcatgc tgaaggccgg caactcggcg agctacgtct gtgtgctgta cgcgctgatg | 180 |
| cacatcggcg cctcgatcgt cctcgtcgac cagcaggaac acaaggagga gacccgccgc | 240 |
| atcgcgctgc gcaccggcgt caaggtcacc ttcgtcgacg acgagacccc gatcgaccag | 300 |
| gacgccgacc ccatccacct gtacgaactc atggtggcca cccagaaccg tccgcccattg | 360 |
| gacagcgccc tgtcgttcga cgcttggggc gagctgtccg acggcctcat catgtggacc | 420 |
| tcgggctcca ccggatcgcc caagggcgtg gtgaagtccg gcgggaagtt cctggccaac | 480 |
| ctccggcgca acgcccacca ggtcggccac cgtcccgcag acgtcctgat gccgctgctg | 540 |
| ccgttcgccc accagtacgg cctgtcgatg gtccatcatg cctggctcac ccgctgctcc | 600 |
| ctgggtgatcg cccctaccg gcgtctggac cgggcgctgc gcatggcccg cgactcgggc | 660 |

accacggtca tcgacgcgac cccctccagc taccggagca tcctgggcct ggtgaccagg 720
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<210> 57
<211> 553
<212> PRT
<213> Streptomyces aizunensis
<400> 57

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20 25 30
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35 40 45
Met Ala Gly Met Thr Ala Ala Tyr Glu Leu Met Arg Leu Gly Leu Arg
50 55 60
Pro Val Val Tyr Glu Ala Glu Gln Leu Gly Gly Arg Met Arg Ser Val
65 70 75 80
Pro Phe Pro Gly Gln Pro Gly Leu Val Ala Glu Met Gly Ala Met Arg
85 90 95
Phe Pro Leu Ser Ala Arg Ser Leu Phe His Tyr Ile Asp Leu Leu Gly
100 105 110
Leu Arg Thr Ser Pro Phe Pro Asn Pro Leu Ala Ala Asn Thr Pro Ser
115 120 125
Thr Leu Ile Asp Leu Gly Gly Glu Arg His Thr Ala Arg Ser Ala Glu

| 130 | | | | | 135 | | | | | 140 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gln | Leu | Pro | Asp | Val | Tyr | Gln | Glu | Val | Ala | Ser | Ala | Trp | Glu | Lys | Ala |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Leu | Gln | Glu | Arg | Ala | Glu | Leu | Ala | Thr | Met | Arg | Asp | Ala | Ile | Gln | Arg |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Arg | Asp | Val | Glu | Thr | Val | Lys | Gln | Ile | Trp | Asn | Arg | Leu | Val | Arg | Glu |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Phe | Asp | Asp | Gln | Ser | Phe | Tyr | Gly | Phe | Leu | Ala | Thr | Ser | Ser | Ala | Phe |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Pro | Ser | Phe | Arg | His | Arg | Glu | Ile | Phe | Gly | Gln | Val | Gly | Phe | Gly | Thr |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Gly | Gly | Trp | Asp | Thr | Asp | Phe | Pro | Asn | Ser | Leu | Leu | Glu | Ile | Leu | Arg |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Val | Val | Tyr | Thr | Glu | Ala | Asp | Asp | Asn | Gln | Val | Ala | Ile | Asp | Gly | Gly |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Ser | Gln | Gln | Val | Pro | Arg | Gly | Leu | Trp | Glu | His | Arg | Pro | Arg | Gly | Cys |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Ala | His | Trp | Pro | Ala | Gly | Thr | Ser | Leu | Ala | Ser | Leu | His | Gly | Gly | Thr |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Ala | Arg | Pro | Arg | Val | Arg | Ala | Val | Ala | Arg | Asp | Gly | Asp | Gly | Phe | Leu |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Val | Thr | Asp | Ala | Asp | Gly | His | Arg | Glu | Arg | Phe | Ala | Ser | Val | Val | Tyr |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Thr | Pro | His | Val | Trp | Thr | Leu | Leu | Asn | Arg | Val | Ala | Cys | Asp | Pro | Ala |
| | | | 325 | | | | | | 330 | | | | | 335 | |
| Leu | Leu | Thr | Gln | Pro | Leu | Trp | Thr | Ala | Val | Glu | Arg | Thr | His | Tyr | Met |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Gly | Ala | Ser | Lys | Leu | Phe | Val | Leu | Ala | Asp | Arg | Pro | Phe | Trp | Asn | Asp |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Thr | Asp | Pro | Arg | Thr | Gly | Arg | Pro | Val | Met | Ser | Met | Thr | Leu | Thr | Asp |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Arg | Met | Pro | Arg | Gly | Val | Tyr | Leu | Phe | Asp | Asp | Gly | Pro | Asp | Arg | Pro |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Gly | Val | Met | Cys | Leu | Ser | Tyr | Thr | Trp | Asn | Asp | Asp | Ser | Leu | Lys | Met |
| | | | 405 | | | | | | 410 | | | | | 415 | |
| Ala | Thr | Leu | Ser | Ala | Asp | Glu | Arg | Leu | Asp | Val | Leu | Leu | Glu | Lys | Leu |
| | | | 420 | | | | | 425 | | | | | 430 | | |
| Gly | Val | Ile | Tyr | Pro | Gly | Val | Asp | Ile | Arg | Ser | His | Val | Ile | Gly | Asp |
| | 435 | | | | | 440 | | | | | 445 | | | | |
| Pro | Ile | Thr | Ile | Thr | Trp | Glu | Ser | Glu | Pro | His | Phe | Met | Gly | Ala | Phe |

450 455 460
 Lys Ser Asn Leu Pro Gly Gln Tyr Arg Tyr Gln Arg Arg Leu Phe Thr
 465 470 475 480
 Gln Phe Met Gln Arg Gly Leu Pro Arg Ala Gln Arg Gly Phe Phe Leu
 485 490 495
 Cys Gly Asp Asp Val Ser Trp Thr Ala Gly Phe Ala Glu Gly Ala Val
 500 505 510
 Thr Thr Ala Leu Asn Ala Val Trp Gly Val Leu Asp His Leu Gly Gly
 515 520 525
 Ala Thr Pro Pro Gly Asn Pro Gly Pro Gly Asp Leu Phe Asp Ala Leu
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 Ala Pro Leu Asp Leu Pro Tyr Asp Ser
 545 550

<210> 58
 <211> 1662
 <212> DNA
 <213> Streptomyces aizunensis

<400> 58
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 ccggtggccg tggtcggcgg gggaatggcg ggaatgaccg ccgcgtacga actgatgcgg 180
 ctgggcctgc gcccggtcgt atacgaggcg gagcaactgg gtggccggat gcggtcgggtg 240
 cccttccccg ggcagcccgg cctcgtggcg gagatggggg cgatgcgctt cccgctctcc 300
 gcgcgctcgc tgttccacta catcgacctg ctggggctgc gcaccagccc cttccccaac 360
 ccgctggcgg cgaacacccc gagcacctc atcgacctcg gcggcgaacg gcacaccgcg 420
 cggctccgcg agcaactccc ggatgtgtac caggaggtgg cctcggcctg ggagaaggcc 480
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 ttctctggcg ccagttcggc gttcccgtcg ttccggcacc gggagatctt cggccagggtg 660
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<210> 59
 <211> 231
 <212> PRT
 <213> *Streptomyces aizunensis*

<400> 59

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| Met | Ile | Glu | Glu | Leu | Leu | Pro | Glu | Gly | Ala | Val | Ala | Ser | Glu | Ala | Phe | 1 | 5 | 10 | 15 |
| Gly | Pro | Asp | Gly | Ser | Ala | Leu | Leu | Tyr | Pro | Glu | Glu | Ala | Ala | Leu | Val | 20 | 25 | 30 | |
| Ala | Met | Thr | Thr | Asp | Leu | Arg | Arg | Glu | Glu | Phe | Ala | Thr | Val | Arg | Ala | 35 | 40 | 45 | |
| Cys | Ala | Arg | Arg | Ala | Leu | Ala | Ala | Leu | Gly | Leu | Pro | Ser | Ala | Pro | Val | 50 | 55 | 60 | |
| Leu | Pro | Gly | Val | Arg | Asn | Val | Pro | Gln | Trp | Pro | Asp | Gly | Val | Val | Gly | 65 | 70 | 75 | 80 |
| Ser | Met | Thr | His | Cys | Ala | His | Tyr | Arg | Ala | Ala | Val | Leu | Ala | Arg | Asp | 85 | 90 | 95 | |
| Thr | Asp | Leu | Ala | Met | Ile | Gly | Ile | Asp | Ala | Glu | Pro | Asp | Leu | Pro | Leu | 100 | 105 | 110 | |
| Pro | Glu | Gly | Val | Leu | Glu | Ser | Ile | Ala | Leu | Pro | Arg | Glu | Leu | Ala | Trp | 115 | 120 | 125 | |
| Ala | Arg | Ser | Gly | Gly | Tyr | Gly | Ser | Ser | Leu | Arg | Arg | Asp | Arg | Leu | Leu | 130 | 135 | 140 | |
| Phe | Ser | Ala | Lys | Glu | Ala | Val | Tyr | Lys | Thr | Trp | Tyr | Pro | Leu | Leu | Gly | 145 | 150 | 155 | 160 |

Thr Glu Leu Asp Phe Asp Asp Ala Asp Ile Thr Phe Arg His Glu Val
 165 170 175
 Gly Pro Asn Gly Arg Pro Gln Gly Thr Phe Thr Ala Arg Ile Leu Arg
 180 185 190
 Pro Leu Pro Gly Pro Asp Gly Arg Pro Val Asp Arg Phe Thr Gly Arg
 195 200 205
 Trp Leu Ser Asp Arg Gly Ile Ile Val Thr Val Ile Thr Leu Pro Ala
 210 215 220
 Tyr Arg Val Ala Thr Thr Arg
 225 230

<210> 60
 <211> 696
 <212> DNA
 <213> Streptomyces aizunensis

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 gaggagtctc ccaccgtccg ggcgtgtgcg cggcgcgccc tcgccgcact ggggctgccg 180
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<210> 61
 <211> 306
 <212> PRT
 <213> Streptomyces aizunensis

<400> 61

Met Ser His Thr Pro Pro Asp His Val Thr Ala Glu Ala Gly Pro Arg
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 Leu Leu Ala Val Ser Asp Leu His Ile Gly Met Ala Asp Asn Arg Pro
 20 25 30
 Ile Thr Glu Ser Leu Arg Pro Ser His Glu Asp Asp Trp Leu Ile Val

| 35 | | | | | 40 | | | | | 45 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Gly | Asp | Val | Gly | Glu | Leu | Thr | Glu | Asp | Ile | Glu | Trp | Ala | Leu | Arg |
| 50 | | | | | | 55 | | | | 60 | | | | | |
| Leu | Leu | Ala | Gly | Arg | Phe | Ala | Lys | Val | Val | Trp | Ala | Pro | Gly | Asn | His |
| 65 | | | | 70 | | | | | | 75 | | | | 80 | |
| Glu | Leu | Trp | Thr | Pro | Arg | Glu | Asp | Thr | Val | Gln | Leu | Arg | Gly | Glu | Glu |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Arg | Tyr | Arg | Tyr | Leu | Val | Glu | Met | Cys | Arg | Gly | Leu | Gly | Val | Val | Thr |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Pro | Glu | Asp | Pro | Trp | Pro | Val | Trp | Glu | Gly | Pro | Gly | Gly | Pro | Val | Ala |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Val | Ala | Pro | Leu | Phe | Leu | Leu | Tyr | Asp | Tyr | Thr | Phe | Arg | Val | Ala | Gly |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Thr | Ser | Thr | Lys | Glu | Glu | Ser | Leu | Ala | Arg | Ala | His | Glu | Ala | Gly | Val |
| 145 | | | | 150 | | | | | 155 | | | | | 160 | |
| Val | Cys | Thr | Asp | Glu | Tyr | Leu | Leu | His | Pro | Asp | Pro | Tyr | Arg | Ser | Arg |
| | | | 165 | | | | | | 170 | | | | | 175 | |
| Asp | Asp | Trp | Cys | Arg | Ala | Arg | Val | Ser | Ala | Thr | Arg | Arg | Arg | Leu | Val |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Ala | His | Asp | Pro | Ser | Val | Pro | Leu | Val | Leu | Val | Asn | His | Phe | Pro | Leu |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Val | Arg | Glu | Pro | Thr | Asp | Val | Leu | Trp | His | Pro | Glu | Phe | Ala | Gln | Trp |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Cys | Gly | Thr | Val | Leu | Thr | Ala | Asp | Trp | His | Arg | Arg | Phe | Ser | Thr | Ala |
| 225 | | | | 230 | | | | | 235 | | | | | 240 | |
| Ala | Val | Val | Tyr | Gly | His | Leu | His | Ile | Pro | Arg | Thr | Thr | Trp | Tyr | Asp |
| | | | 245 | | | | | 250 | | | | | | 255 | |
| Gly | Val | Arg | Phe | Glu | Glu | Val | Ser | Ile | Gly | Tyr | Pro | Arg | Glu | Trp | Arg |
| | | 260 | | | | | 265 | | | | | | 270 | | |
| Arg | Arg | Gly | His | Pro | Arg | Gly | Leu | Leu | Arg | Gln | Ile | Leu | Pro | Tyr | Thr |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Pro | Glu | Pro | Glu | Pro | Glu | Thr | Pro | Ala | Arg | Thr | Glu | Pro | Gln | Glu | Thr |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Arg | Ala | | | | | | | | | | | | | | |
| 305 | | | | | | | | | | | | | | | |

<210> 62
 <211> 921
 <212> DNA
 <213> Streptomyces aizunensis

<400> 62
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60

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tgggcgctgc gcctgctggc cgggcggttc gccaaggctg tgtgggcgcc gggcaaccac 240
gagctgtgga ccccgcgcgga ggacacggtg cagttgcgcg gcgaggagcg ctaccggtac 300
ctgggtggaga tgtgccgggg gctgggcgtg gtcacgcccg aggaccctg gccggtgtgg 360
gaggggtccc gcgggccggt cgcggtcgct ccgctgttcc tgctgtacga ctacacgttc 420
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ttcgcgcagt ggtgcggcac ggtgctgacc gccgactggc accgccggtt cagcacggcc 720
gccgtggtgt acgggcacct gcacatcccc aggaccacct ggtacgacgg ggtccggttc 780
gaggaggtgt cgatcggcta cccgcgcgag tggcgccggc gcggccatcc cagggggctg 840
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<210> 63
<211> 998
<212> PRT
<213> Streptomyces aizunensis

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<400> 63

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Gly Arg Leu Thr Ser Phe Val Ser Gly Thr Ala Ser Gly Ala Val Ala
          20           25           30

Ala Ala Ala Ala Gly Thr Gly Arg Ile Ala Val Ile Asp Gly Pro Val
          35           40           45

Ala Ser Gly Lys Thr Ala Leu Leu His Arg Val Leu Glu Leu Thr Ala
          50           55           60

Gly Ala Gly Pro Arg Val Ile Thr Ala Val Thr Ser Pro Ala Glu Gln
65           70           75           80

Ser Met Pro Phe Gly Val Val Glu Gln Leu Val Arg Asp Ala Gln Ala
          85           90           95

Val Ser Asp Arg Leu Pro Leu His Pro Ser Ala Gly Pro Asp Ala Ala
          100          105          110

```

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Asp | Ser | Thr | Pro | Arg | Pro | Glu | Ser | Glu | Pro | Val | Pro | Ala | Glu | Ile | 115 | 120 | 125 |
| Leu | Met | Ala | Phe | His | Leu | Gln | Leu | Ala | Glu | Val | Cys | Ala | Arg | Gly | Pro | 130 | 135 | 140 |
| Val | Leu | Ile | Val | Val | Asp | Asp | Val | Gln | Tyr | Ala | Asp | Pro | Gln | Ser | Leu | 145 | 150 | 155 |
| Tyr | Cys | Leu | Ala | His | Met | Leu | Leu | Arg | Ala | Ser | Ala | Ser | Gly | Ala | Val | 165 | 170 | 175 |
| Val | Ser | Leu | Leu | Val | Ser | Arg | Gly | Pro | Asp | Val | Gly | Gly | Thr | Pro | Pro | 180 | 185 | 190 |
| Val | Val | Leu | Glu | Glu | Leu | Leu | Tyr | Gln | Leu | Arg | Gly | Leu | His | Val | Arg | 195 | 200 | 205 |
| Leu | Gly | Pro | Leu | Ser | Val | Asp | Gly | Val | Gly | Arg | Leu | Leu | Ala | Ala | Arg | 210 | 215 | 220 |
| Asp | Pro | Glu | Ala | Gly | Ala | Arg | Lys | Pro | Ala | Ala | Pro | Ala | Ser | Trp | Ser | 225 | 230 | 235 |
| Thr | Pro | Leu | Ala | Ala | Ser | Val | His | Ala | Ala | Thr | Gly | Gly | Asn | Pro | Leu | 245 | 250 | 255 |
| Leu | Val | His | Gly | Leu | Ile | Glu | Asp | Arg | Leu | Ser | Arg | Gln | Arg | Leu | Leu | 260 | 265 | 270 |
| Ala | Ala | Gly | Pro | Gly | Ala | Gly | Pro | Ala | Ser | Ala | Glu | Ala | Gly | Asn | Gly | 275 | 280 | 285 |
| Thr | Gly | Asn | Glu | Thr | Glu | Asp | Ala | Leu | Ala | Gly | Thr | Pro | His | Ala | Gly | 290 | 295 | 300 |
| Asp | Gln | Phe | Leu | Gln | Ser | Ala | Leu | Ile | Cys | Val | His | Arg | Thr | Gly | Ser | 305 | 310 | 315 |
| Asp | Gly | Leu | Arg | Val | Ala | Gln | Gly | Ile | Ala | Leu | Leu | Gly | Gly | Ala | Gly | 325 | 330 | 335 |
| Ser | Thr | Ser | Leu | Leu | Ala | Arg | Leu | Val | Glu | Val | Glu | Glu | Trp | Thr | Val | 340 | 345 | 350 |
| Glu | Gln | Val | Val | Thr | Ala | Leu | Asn | Glu | Ala | Gly | Val | Leu | Glu | Lys | Ser | 355 | 360 | 365 |
| Val | Phe | Arg | His | Gly | Gly | Val | Gln | Thr | Ala | Val | Val | Glu | Ser | Leu | Thr | 370 | 375 | 380 |
| Asp | Glu | Ala | Ala | Thr | Arg | Leu | Arg | Gln | Arg | Ala | Ala | Val | Leu | Leu | Tyr | 385 | 390 | 395 |
| Glu | Asp | Gly | Ala | Ala | Pro | Leu | Thr | Ile | Ala | Ala | Gln | Leu | Leu | Ser | His | 405 | 410 | 415 |
| Glu | Met | Ser | Ala | Pro | Asp | Glu | Glu | Trp | Val | Pro | Arg | Val | Leu | Ser | Glu | 420 | 425 | 430 |

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Ala | Ala | Arg | Ala | Ala | Leu | Cys | Thr | Gln | Gln | Val | Glu | Phe | Ala | Val | Arg | | |
| | | 435 | | | | | 440 | | | | | 445 | | | | | |
| Cys | Leu | Arg | Met | Ala | Glu | Ser | Cys | Cys | Arg | Asp | Glu | Thr | Glu | Arg | Met | | |
| | | 450 | | | | 455 | | | | | 460 | | | | | | |
| Leu | Leu | Arg | Ala | His | Leu | Ala | Lys | Tyr | Ile | Trp | Arg | Val | Gln | Pro | Ser | | |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 | | |
| Ala | Trp | Pro | Gln | Gln | Leu | Arg | Pro | Leu | Leu | Gly | Ala | Val | Arg | Asp | Gly | | |
| | | | | 485 | | | | | 490 | | | | | 495 | | | |
| Leu | Leu | Pro | Pro | Val | Asp | Thr | Val | Arg | Leu | Val | Tyr | Asp | Leu | Leu | Trp | | |
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| Asn | Gly | Trp | Met | Asp | Asp | Ala | Ala | Ala | Ala | Ile | Arg | Gln | Val | Val | Asp | | |
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| Val | Leu | His | Arg | Ser | Pro | Asp | Ala | Arg | Leu | Ala | Thr | Glu | Leu | Gly | Ala | | |
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| Leu | Arg | Leu | Ala | Leu | Ala | Ser | Thr | Tyr | Pro | Ala | Val | Leu | Glu | His | Leu | | |
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| Gly | Asp | Val | Pro | Ala | Pro | Ala | Arg | Gly | Ala | Gly | Glu | Arg | Leu | Ser | Ala | | |
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| Gln | Glu | Glu | Ile | Leu | Leu | Thr | Ser | Ala | Arg | Val | Leu | His | Gly | Val | Leu | | |
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| Arg | Gly | Gly | Asp | Gly | Ala | Arg | Asp | Thr | Asp | Pro | Asp | Thr | Asp | Ala | Glu | | |
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| Asp | Phe | Ala | Glu | Ser | Ala | Glu | Arg | Thr | Leu | Ala | Gly | Thr | Arg | Leu | Thr | | |
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| Glu | Glu | Thr | His | Leu | Gly | Leu | Arg | Ala | Cys | Leu | Leu | Thr | Leu | Phe | Tyr | | |
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| | | | | 645 | | | | | 650 | | | | | 655 | | | |
| Glu | Ala | Ala | Asp | Arg | Lys | Ala | Pro | Gly | Trp | Thr | Ala | Val | Leu | Arg | Ala | | |
| | | | 660 | | | | | 665 | | | | | 670 | | | | |
| Ile | Arg | Ala | His | Met | Ser | Leu | Arg | Arg | Gly | His | Leu | Val | Glu | Ala | Arg | | |
| | | 675 | | | | | 680 | | | | | 685 | | | | | |
| Arg | Leu | Ala | Glu | Gln | Ala | Leu | Asp | Gln | Leu | Pro | Pro | His | Gly | Trp | Gly | | |
| | 690 | | | | | 695 | | | | | 700 | | | | | | |
| Val | Gly | Ile | Gly | Met | Pro | Leu | Ser | Ala | Leu | Ile | Glu | Ala | Arg | Thr | Ala | | |
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| Met | Gly | Asp | His | Glu | Ala | Ala | Ala | Glu | Leu | Leu | Asp | Arg | Pro | Val | Pro | | |
| | | | | 725 | | | | | 730 | | | | | 735 | | | |
| Glu | Asp | Met | Leu | Thr | Thr | Arg | His | Gly | Leu | His | Tyr | Leu | Tyr | Ala | Arg | | |
| | | 740 | | | | | | 745 | | | | | 750 | | | | |

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 Phe Thr Ala Cys Gly Glu Leu Met Arg Arg Trp Gly Met Asp Arg Ser
 770 775 780
 Thr Leu Val Pro Trp Arg Val Gly Val Ala Glu Ala Arg Leu Ala Leu
 785 790 795 800
 Gly Ser Arg Glu Glu Ala Glu Arg Phe Ala Arg Glu Gln Leu Ala Gly
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 Ala Arg Pro Leu Arg Glu Arg Pro Ala Leu Leu Ala Gln Ala Val Ala
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 Asp Leu Gly Gln Ala Tyr Lys Gln Leu Gly Asp Pro Ser Gln Gly Lys
 865 870 875 880
 Val His Thr Arg Arg Ala Trp Arg Ile Ala Lys Gly Cys Gly Ala Arg
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 Glu Leu Tyr Arg Ser Leu His Pro Ser Gln Pro Pro Ala Pro Ser Ala
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<213> Streptomyces aizunensis

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| Glu | Glu | Ala | Val | Arg | Gly | Pro | Ser | Asp | Arg | Ala | Thr | Glu | Ala | Gln | His |
| | | | 20 | | | | | 25 | | | | | | 30 | |
| Ala | Lys | Gly | Lys | Leu | Thr | Ala | Arg | Glu | Arg | Ile | Gly | Leu | Leu | Leu | Asp |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Glu | Gly | Ser | Phe | Arg | Glu | Val | Glu | Gln | Leu | Arg | Arg | His | Arg | Ala | Ser |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Gly | Phe | Gly | Leu | Glu | Ala | Lys | Arg | Pro | Tyr | Thr | Asp | Gly | Val | Ile | Thr |
| 65 | | | | | 70 | | | | | 75 | | | | 80 | |
| Gly | Trp | Gly | Thr | Ile | Glu | Gly | Arg | Thr | Val | Phe | Val | Tyr | Ala | His | Asp |
| | | | | 85 | | | | | 90 | | | | | 95 | |

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Phe | Arg | Ile | Phe | Gly | Gly | Ala | Leu | Gly | Glu | Ala | His | Ala | Thr | Lys | Ile | | |
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| His | Lys | Ile | Met | Asp | Met | Ala | Ile | Ala | Ala | Gly | Ala | Pro | Leu | Val | Ser | | |
| | | 115 | | | | | 120 | | | | | 125 | | | | | |
| Leu | Asn | Asp | Gly | Ala | Gly | Ala | Arg | Ile | Gln | Glu | Gly | Val | Ser | Ala | Leu | | |
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| Ala | Gly | Tyr | Gly | Gly | Ile | Phe | Gln | Arg | Asn | Thr | Lys | Ala | Ser | Gly | Val | | |
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| Ile | Pro | Gln | Ile | Ser | Val | Met | Leu | Gly | Pro | Cys | Ala | Gly | Gly | Ala | Ala | | |
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| Tyr | Ser | Pro | Ala | Leu | Thr | Asp | Phe | Val | Phe | Met | Val | Arg | Glu | Thr | Ser | | |
| | | | 180 | | | | | 185 | | | | | 190 | | | | |
| Gln | Met | Phe | Ile | Thr | Gly | Pro | Asp | Val | Val | Lys | Ala | Val | Thr | Gly | Glu | | |
| | | 195 | | | | | 200 | | | | | 205 | | | | | |
| Glu | Ile | Thr | Gln | Asn | Gly | Leu | Gly | Gly | Ala | Asp | Val | His | Ala | Gly | Thr | | |
| | 210 | | | | | 215 | | | | | 220 | | | | | | |
| Ser | Gly | Val | Ala | His | Phe | Ala | Tyr | Asp | Asp | Glu | Glu | Thr | Cys | Ile | Ala | | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | | |
| Glu | Val | Arg | Tyr | Leu | Leu | Ser | Met | Leu | Pro | Ser | Asn | Asn | Arg | Glu | Asn | | |
| | | | | 245 | | | | | 250 | | | | | 255 | | | |
| Pro | Pro | Ala | Val | Gln | Ala | Gly | Asp | Pro | Ala | Asp | Arg | Arg | Cys | Asp | Ala | | |
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| Leu | Leu | Asn | Leu | Val | Pro | Val | Asp | Gly | Asn | Arg | Pro | Tyr | Asp | Met | Leu | | |
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| Lys | Val | Ile | Glu | Glu | Ile | Val | Asp | Asp | Gly | Asp | Tyr | Val | Glu | Ile | His | | |
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| Gln | Val | Val | Ala | Ile | Val | Ala | Asn | Gln | Pro | Gln | Phe | Leu | Ala | Gly | Val | | |
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| Leu | Asp | Ile | Gly | Ala | Ser | Glu | Lys | Ala | Ala | Arg | Phe | Val | Gln | Met | Cys | | |
| | | | 340 | | | | | 345 | | | | | 350 | | | | |
| Asp | Ala | Phe | Asn | Ile | Pro | Ile | Val | Thr | Leu | Leu | Asp | Val | Pro | Gly | Phe | | |
| | | 355 | | | | | 360 | | | | | 365 | | | | | |
| Leu | Pro | Gly | Val | Asp | Gln | Glu | His | Gly | Gly | Ile | Ile | Arg | His | Gly | Ala | | |
| | 370 | | | | | 375 | | | | | 380 | | | | | | |
| Lys | Leu | Leu | Tyr | Ala | Tyr | Cys | Asn | Ala | Thr | Val | Pro | Arg | Ile | Ser | Leu | | |
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| Ile | Leu | Arg | Lys | Ala | Tyr | Gly | Gly | Ala | Tyr | Ile | Val | Met | Asp | Ser | Gln | | |
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 Val Met Gly Ala Glu Gly Ala Ala Asn Val Ile Phe Arg Arg Gln Ile
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 Ala Glu Ser Gly Asp Pro Glu Ala Met Arg Ala Arg Met Val Lys Glu
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 Tyr Lys Ala Glu Leu Met His Pro Tyr Tyr Ala Ala Glu Arg Gly Leu
 465 470 475 480
 Val Asp Asp Val Ile Asp Pro Ala Glu Thr Arg Glu Val Leu Ile Ala
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| Met | Thr | Ala | His | Pro | Asn | Gly | Val | Thr | Pro | Pro | Leu | Pro | Pro | Thr | Glu | 1 | 5 | 10 | 15 |
| Thr | Asp | Arg | Thr | Leu | His | Phe | Ala | Gly | Pro | Ala | Thr | Phe | Gly | Arg | Ile | 20 | 25 | 30 | |
| Pro | Arg | Ile | Asp | Gln | Val | Glu | Lys | Thr | Asp | Ile | Ala | Val | Val | Gly | Val | 35 | 40 | 45 | |
| Pro | Phe | Asp | Ser | Gly | Val | Thr | Tyr | Arg | Pro | Gly | Ala | Arg | Phe | Gly | Gly | 50 | 55 | 60 | |
| Asn | Ala | Ile | Arg | Glu | Ala | Ser | Arg | Thr | Leu | Arg | Pro | Tyr | Asn | Pro | Ala | 65 | 70 | 75 | 80 |
| Gln | Asn | Val | Tyr | Pro | Phe | His | Phe | Ser | Gln | Val | Ala | Asp | Ala | Gly | Asp | 85 | 90 | 95 | |
| Ile | Ser | Ala | Asn | Pro | Phe | Asp | Leu | Asn | Asp | Ala | Val | Glu | Thr | Ile | Glu | 100 | 105 | 110 | |
| Ala | Ala | Ala | Asp | Asp | Leu | Ile | Ser | Ser | Gly | Ala | Arg | Leu | Met | Thr | Leu | 115 | 120 | 125 | |
| Gly | Gly | Asp | His | Thr | Ile | Ala | Leu | Pro | Met | Leu | Arg | Ala | Val | Ala | Lys | 130 | 135 | 140 | |
| Lys | His | Gly | Pro | Leu | Ala | Val | Leu | His | Phe | Asp | Ala | His | Leu | Asp | Thr | 145 | 150 | 155 | 160 |
| Trp | Asp | Asp | Tyr | Phe | Gly | Gln | Gln | Tyr | Thr | His | Gly | Met | Pro | Phe | Arg | 165 | 170 | 175 | |

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 Gly Thr Arg Gly Pro Ile Tyr Gly Lys Lys Asp Leu Asp Asp Asp Glu
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 Lys Leu Gly Phe Gly Ile Val Thr Ser Ala Asp Val Met Arg Arg Gly
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 Val Asp Glu Val Ala Gln Gln Leu Arg Glu Arg Val Gly Asp Arg Pro
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 Gly Thr Gly Thr Pro Glu Ala Gly Gly Leu Thr Ser Arg Glu Leu Leu
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 Glu Ile Leu Arg Gly Leu Ala Asp Cys His Leu Val Ser Ala Asp Ile
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|---|-----|
| ctgtacatct ccacgacat cgacgtcctg gaccggcgcg acgccccggg caccggcacc | 780 |
| cccgaggccg ggggcctcac ctcccgcgag ctgctggaga tctgcgcg gctcgccgac | 840 |
| tgccacctgg tctccgcgga catcgtggag gtcgctccgg cctacgacca cgccgacatc | 900 |
| acctcggtgg cggcgtccca cgctgcctac gagctgatca gcatcatgtc caagcagata | 960 |
| gccccggtcc gctgggggtgc gacgcagtaa | 990 |

<210> 69
 <211> 521
 <212> PRT
 <213> Streptomyces aizunensis

<400> 69

| | |
|---|-----------------|
| Val Thr Pro Gln Asp His Trp Trp Ser Ala Ser Gln Ser Tyr Val Ser | 1 5 10 15 |
| Asp Ile Leu Ser Val Phe Ala Ala Ala Pro Asp Arg Pro Ala Val Asn | 20 25 30 |
| Trp Arg Gly Glu Thr Ala Ser Gly Gly Glu Leu Ile Arg Ser Val Thr | 35 40 45 |
| Glu Ala Phe His Ala Leu His Asp Ser Gly Val Arg Ala Gly Asp Val | 50 55 60 |
| Val Ala Ile Leu Val Ala Pro Asn Ser Pro Glu Met Leu Thr Ala Arg | 65 70 75 80 |
| Tyr Ala Ala His Leu Leu Gly Gly Ala Val Cys Tyr Leu Arg Ser Thr | 85 90 95 |
| Asn Pro Gly Thr Ser Glu Val Ala Leu Pro Leu Asp Gln Gln Ile Arg | 100 105 110 |
| Ile Leu Arg Asp Thr Glu Ala Val Thr Val Tyr Thr Asp Ala Glu Asn | 115 120 125 |
| Ala Pro Arg Ala Ala Glu Leu Ala Ala Gly Ala Ser Gly Leu Pro Val | 130 135 140 |
| Thr Cys Leu Thr Gly Glu Ala Arg Lys Arg Glu Ser Ala Glu Asp Ala | 145 150 155 160 |
| Pro Arg Ala Leu Pro Trp Ala Pro Asp Ala Leu Ala Leu Ile Thr Phe | 165 170 175 |
| Thr Ser Gly Ser Thr Gly Arg Pro Lys Gly Ile Arg Leu Ala Gly Arg | 180 185 190 |
| Ala Trp Asn Gly Leu Val Gln Gly Met Val Ala Ala Gly Gly Glu Ala | 195 200 205 |
| Glu Gly Val Lys Leu Leu Val Thr Thr Pro Leu Ser His Thr Val Gly | 210 215 220 |

Ser Met Ala Asp Thr Ala Leu Ala Leu Gly Gly Glu Val Tyr Leu His
 225 230 235 240
 Glu Asn Phe Asn Ala Glu Gln Phe Val Asn Thr Val Ala Asp Glu Gly
 245 250 255
 Ile Ala Trp Thr Phe Met Ala Thr Val His Leu Phe Gln Leu Leu Asp
 260 265 270
 His Leu Glu Glu Arg Gly Leu Lys Asp Val Glu Glu Gly Arg Leu Ala
 275 280 285
 Pro Leu Gln Arg Leu Ile Tyr Ser Gly Ser Ala Ala Ala Pro Ala Arg
 290 295 300
 Ile Ala Gln Ala Val Lys Ala Phe Gly Leu Ile Ile Val Gln Ala Tyr
 305 310 315 320
 Gly Thr Gly Glu Thr Gly Arg Leu Thr Thr Leu Phe Pro His Glu His
 325 330 335
 Leu Asp Pro Trp Leu Ser Thr Thr Val Gly Arg Pro Phe Pro Asp Val
 340 345 350
 Glu Val Val Val Gly Asp Gln Glu Ser Gly Ala Pro Leu Ala Thr Gly
 355 360 365
 Glu Val Gly Glu Val Arg Val Arg Ser Pro His Met Met Asp Gly Tyr
 370 375 380
 Thr Gly Asp Pro Ala Ala Thr Ala Lys Val Leu Arg Asp Gly Trp Tyr
 385 390 395 400
 His Thr Gly Asp Ile Gly Tyr Thr Asp Glu His Gly Tyr Leu His Leu
 405 410 415
 Leu Gly Arg Val Ala Asp Val Val Lys Val Asn Gly Val Lys Val His
 420 425 430
 Pro Thr Val Val Glu Arg Glu Leu Leu Ser Leu Ala Gly Val Arg His
 435 440 445
 Ala Ala Val Tyr Gly Val Arg Asp Gln Asp Ala Val Glu His Leu His
 450 455 460
 Ala Thr Ile Val Cys Asp Pro Ala Val Pro Val Glu Thr Asp Ala Ile
 465 470 475 480
 Arg Ala His Leu Ala Gln Ser Leu Ser Gly Leu His Val Pro Glu Lys
 485 490 495
 Ile Ser Val Val Ala Asp Leu Pro Leu Asn Asp Asn Gly Lys Pro Asp
 500 505 510
 Lys Val Arg Leu Gln Leu Leu Asp Ser
 515 520

<210> 70
 <211> 1566
 <212> DNA

<213> Streptomyces aizunensis

<400> 70

| | | | | | | |
|------------|-------------|-------------|-------------|-------------|-------------|------|
| gtgaccccg | aggaccattg | gtggagcgca | agccagagtt | acgtctcgg | catcctctcc | 60 |
| gttttcgcgg | cggccccgga | ccgccccgcg | gtgaattggc | ggggcgagac | ggcctccggc | 120 |
| ggtgaattga | ttcggtcggt | gaccgaggcg | ttccacgcac | tgcacgacag | cggcgtgcgc | 180 |
| gcgggcgatg | tcgtggccat | cctgggtggcg | cccaacagcc | cggagatgct | cacggcacgg | 240 |
| tacgcggcgc | acctgctcgg | cggcgcggtg | tgctacctgc | ggccacca | ccccggaacc | 300 |
| agcgaggtgg | cccttcgcgt | ggaccagcag | atccgatcc | tgccggacac | cgaggccgtg | 360 |
| accgtctaca | cggacgccga | gaacgcgccg | cgccgcgccg | aactggccgc | gggcgccagt | 420 |
| ggactgcccc | tgacgtgcct | gacgggtgag | gcgcgcaaga | gggagagcgc | ggaagacgct | 480 |
| ccgcgcgccc | tgccgtgggc | cccgatgca | ctggccctca | tcacgttcac | cagcggcagc | 540 |
| accggacggc | cgaagggcat | ccggctggcg | ggccggggcgt | ggaacggcct | ggtccagggc | 600 |
| atggtggcgg | ccggcgccga | agccgagggc | gtcaagctcc | tggtcaccac | cccgttgagc | 660 |
| cacaccgtcg | gcagcatggc | ggacaccgcg | ctggcgctgg | gcggcgaggt | ctacctgcac | 720 |
| gagaacttca | acgccgaaca | gttcgtcaac | accgtggccg | acgagggcat | cgcgtggacc | 780 |
| ttcatggcga | cgggccatct | gttcagctg | ctcgaccacc | tggaggagcg | cggcctgaag | 840 |
| gacgtcgagg | aaggacgcct | ggccccgctg | cagcggctca | tctacagcgg | cagcgcggcg | 900 |
| gcgcccccca | ggatcgccca | ggccgtgaag | gccttcggtc | tcacatcgt | gcaggcgctac | 960 |
| ggcacgggag | agaccggccg | gctcaccacc | ctcttccgc | acgagcacct | ggaccctgtg | 1020 |
| ctctcgacca | ccgtcggggc | gcccttcccc | gatgtggagg | tcgtcgtcgg | cgaccaggag | 1080 |
| tcgggcgcgc | cgctcgccac | cggcgaggtc | ggcgaagtcc | gcgtgcgctc | cccgcacatg | 1140 |
| atggacggct | acaccgggga | cccggcggcc | accgcgaagg | tcctgcgcga | cggctggtac | 1200 |
| cacaccggcg | acatcggtta | caccgacgaa | cacggctatc | tgcacctgct | gggccgggtc | 1260 |
| gccgacgtgg | tcaagggtcaa | cggcgtcaag | gtccaccgca | cggtggtcga | acgggagctc | 1320 |
| ctctcgctcg | cgggcgtccg | gcacgccgcg | gtgtacggcg | tgccggacca | ggacgccgtg | 1380 |
| gagcacctgc | acgccacgat | cgtgtgcgac | ccggcggtgc | cggtgagac | cgacgccatt | 1440 |
| cgcgcgaccc | tcgcccagtc | cctctccggg | ctgcacgtgc | ccgaaaagat | cagcgtcgtc | 1500 |
| gccgatctgc | cgctgaatga | caacggaaag | cccgacaagg | tgccggctgca | gctgctcgac | 1560 |
| tcctga | | | | | | 1566 |

<210> 71

<211> 410

<212> PRT

<213> Streptomyces aizunensis

<400> 71

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Met | Asn | Leu | His | Leu | Glu | Ser | Tyr | Ser | Thr | Gly | Val | Thr | Ala | Lys | Glu | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |
| Leu | Ala | Glu | Arg | Arg | Arg | Glu | Phe | Leu | Glu | Ile | Gly | Arg | Arg | Ser | Gly | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |
| His | Phe | Pro | Ser | Ala | Ser | Ala | Arg | Gln | Asp | Gly | Val | Asp | Ser | Gln | Ile | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |
| Ser | Val | Trp | Cys | Ser | Asn | Asp | Tyr | Leu | Gly | Met | Gly | Gln | Asn | Pro | Gln | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |
| Val | Ile | Glu | Ala | Met | Lys | Lys | Thr | Ile | Asp | Thr | His | Gly | Val | Gly | Ser | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |
| Gly | Gly | Ser | Arg | Asn | Ile | Gly | Gly | Thr | Asn | His | Tyr | His | Val | Leu | Leu | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |
| Glu | Ala | Glu | Leu | Ala | Asp | Leu | His | Gly | Lys | Glu | Ala | Ala | Leu | Leu | Phe | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| Thr | Ser | Gly | Tyr | Thr | Ala | Asn | Asp | Gly | Ser | Leu | Ser | Val | Leu | Ala | Gly | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| Thr | Pro | Lys | Asp | Thr | Ile | Val | Phe | Ser | Asp | Glu | Lys | Asn | His | Ala | Ser | |
| | 130 | | | | | 135 | | | | | 140 | | | | | |
| Ile | Ile | Asp | Gly | Leu | Arg | His | Ser | Gly | Ala | Gln | Lys | His | Ile | Phe | Arg | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |
| His | Asn | Asp | Val | Ala | His | Leu | Ala | Glu | Leu | Leu | Ala | Ala | Ala | Pro | Ala | |
| | | | 165 | | | | | | 170 | | | | | 175 | | |
| Asp | Arg | Pro | Lys | Leu | Ile | Val | Leu | Glu | Ser | Val | Tyr | Ser | Met | Ser | Gly | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Asp | Ile | Ala | Pro | Leu | Ala | Glu | Ile | Ala | Glu | Leu | Ala | Arg | Arg | Tyr | Asp | |
| | 195 | | | | | 200 | | | | | | 205 | | | | |
| Ala | Thr | Thr | Tyr | Ile | Asp | Glu | Val | His | Ala | Val | Gly | Met | Tyr | Gly | Pro | |
| | 210 | | | | 215 | | | | | | 220 | | | | | |
| Gln | Gly | Ala | Gly | Ile | Ala | Ala | Arg | Glu | Gly | Ile | Ala | Asp | Gln | Phe | Thr | |
| 225 | | | | 230 | | | | | | 235 | | | | | 240 | |
| Val | Val | Met | Gly | Thr | Leu | Ala | Lys | Gly | Tyr | Gly | Thr | Val | Gly | Gly | Tyr | |
| | | | | 245 | | | | | 250 | | | | | 255 | | |
| Ile | Ala | Gly | Pro | Ala | Ala | Leu | Val | Asp | Ala | Val | Arg | Thr | Leu | Ser | Arg | |
| | | | 260 | | | | | 265 | | | | | 270 | | | |
| Ala | Phe | Val | Phe | Thr | Thr | Ser | Leu | Pro | Pro | Ala | Val | Ala | Ala | Gly | Ala | |
| | 275 | | | | | | 280 | | | | | 285 | | | | |
| Leu | Glu | Ala | Val | Arg | Tyr | Leu | Arg | Asn | Ser | Asp | Val | Glu | Arg | Lys | Val | |

| | | |
|---|-----|---------|
| 290 | 295 | 300 |
| Leu Ala Glu Asn Ala Gln Leu Leu His Arg Leu Leu Asp Glu Ala Asp | | |
| 305 | 310 | 315 320 |
| Ile Pro Phe Ile Ser Pro Asp Ser His Ile Val Ser Ala Phe Ile Gly | | |
| | 325 | 330 335 |
| Asp Asp Glu Thr Cys Lys Gln Ala Ser Arg Leu Leu Phe Glu Arg His | | |
| | 340 | 345 350 |
| Gly Ile Tyr Val Gln Ser Ile Asn Ala Pro Ser Val Pro Leu Gly Gln | | |
| | 355 | 360 365 |
| Glu Ile Leu Arg Ile Ala Pro Ser Thr Val His Gly Arg Glu Asp Val | | |
| | 370 | 375 380 |
| Glu Asn Phe Ala Glu Ala Leu Arg Gly Ile Trp Lys Glu Leu Asn Ile | | |
| 385 | 390 | 395 400 |
| Pro Thr Ala Thr Asp Arg Asn Trp Leu Ser | | |
| | 405 | 410 |

<210> 72
 <211> 1233
 <212> DNA
 <213> Streptomyces aizunensis

<400> 72
 atgaacctgc acctggaatc gtattcaacc ggcgtgaccg ccaaggaact cgccgagcgg 60
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 caggacggcg tggactccca gatcagcgtc tgggtgcagca acgactacct cggtatgggg 180
 cagaaccccc aggtcatcga ggcgatgaag aagaccatcg acaccacgg cgtgggctcc 240
 ggcggctcgc ggaacatcgg tggcaccaac cactaccacg tgctgctcga agcggagctg 300
 gcggacctcc acggcaagga ggcggcgctc ctcttcacct ccggctacac ggccaacgac 360
 ggttccttga gcgtcctggc cgggacgccc aaggacacga tcgtcttctc cgacgagaag 420
 aaccacgcgt cgatcatcga cgggctgcgg cacagcggcg cgcagaagca catcttcggg 480
 cacaacgacg tcgcgcacct ggcggagctg ctgcgggccg cccccgccga ccgtccgaag 540
 ctgatcgtcc ttgagtcggg ctattcgatg tcggggcgaca tcgcgccgct ggccgagatc 600
 gccgagctcg cgcgccgcta cgacgccacc acgtacatcg acgaggtgca cgcggctcggc 660
 atgtacgggtc cgcagggcgc cggcatcgcc gcccggtgagg gcatagccga ccagttcacc 720
 gtcgtgatgg gcacgctggc caagggctac ggcaccgctg gcggctacat tgccgggtccc 780
 gccgccctcg tcgacgccgt gcgcaccctg tcgcgcgcct tcgtcttcac cacctcgctg 840
 ccgccggccg tcgcggcggg tgcgctggag gccgtgcgct acctccggaa ctccgacgtc 900
 gagcgggaagg tgctggcgga gaacgcccag ctgctgcacc ggctgctcga tgaggccgac 960

atcccgttca tctcgccgga ctgcacatc gtctccgcct tcatcgggga cgacgagacc 1020
 tgcaagcagg cgtcccggct gctcttcgag cggcacggga tctacgtcca gtccatcaac 1080
 gccccagcg tgccgctcgg ccaggagatc ctgcggatcg cgccgtccac ggtgcacggg 1140
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 ccgacggcca ccgacaggaa ctggctttcg tga 1233

<210> 73
 <211> 506
 <212> PRT
 <213> Streptomyces aizunensis
 <400> 73

Val Thr Arg Ser Val Ala Ala Val Leu Ala Glu Ser Ala Gly Arg Trp
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 Pro Ser Arg Thr Ala Leu Val Cys Gly Ala Glu Arg Ile Ser Tyr Ala
 20 25 30
 Arg Leu Trp Asp Arg Ala Arg Arg Tyr Ala Ala Ala Leu Arg Gly Gln
 35 40 45
 Gly Ile Gly Pro Asp Asp Lys Val Ala Leu Leu Met Pro Asn Thr Pro
 50 55 60
 Glu Phe Ala Ala Val Tyr Phe Ala Val Leu Ala Leu Gly Ala Val Val
 65 70 75 80
 Val Pro Val His Thr Leu Leu Lys Pro Ala Glu Val Ser His Leu Leu
 85 90 95
 Arg Asp Ser Gly Ala Arg Ala Leu Val Trp Ala Gly Thr Leu Pro Gln
 100 105 110
 Glu Thr Ala Arg Asp Ala Gly Glu Thr Gly Val Leu Leu Leu Thr Val
 115 120 125
 Gly Glu Ala Leu His Gly Ser Val Leu Leu Asp Asp Gly Val Glu Pro
 130 135 140
 Ile Asp Thr Tyr Val Glu Arg Gly Ala Asp Asp Leu Ala Leu Val Leu
 145 150 155 160
 Tyr Thr Ser Gly Thr Thr Gly Arg Pro Lys Gly Ala Met Leu Thr His
 165 170 175
 Gly Asn Val Ala Thr Asn Ile Ala Val Thr Ala Val Ser Pro Phe Ala
 180 185 190
 Phe Gly Glu Asp Asp Val Leu Leu Gly Ala Leu Pro Leu Ser His Thr
 195 200 205
 Phe Gly Gln Ile Cys Gly Met Ala Val Thr Phe His Ala Gly Ala Thr
 210 215 220

Leu Val Val Met Glu Arg Phe Glu Ala His Asp Ala Leu Arg Leu Met
 225 230 235 240
 Arg Glu His Gly Cys Thr Val Phe Met Gly Val Pro Thr Met Tyr His
 245 250 255
 Ala Leu Leu Glu Ala Val Ala Ala Gly Ala Pro Ala Pro Arg Leu Thr
 260 265 270
 Arg Val Tyr Ser Gly Gly Ser Ala Leu Pro Val Pro Val Leu Asp Arg
 275 280 285
 Val Arg Ala Ala Phe Gly Cys Glu Val Tyr Glu Gly Tyr Gly Leu Thr
 290 295 300
 Glu Thr Ser Pro Cys Val Ala Tyr Asn Gln Pro Gly Ile Pro Cys Lys
 305 310 315 320
 Pro Gly Thr Val Gly Leu Pro Ile Asp Gly Val Arg Val Ala Ile Ala
 325 330 335
 Asp Ala Glu Leu Glu Gly Arg Ile Arg Leu Leu Lys Gln Gly Asp Ile
 340 345 350
 Gly Glu Ile Val Val Ser Gly His Asn Val Met Ala Gly Tyr Leu Gly
 355 360 365
 Arg Pro Gln Glu Thr Ala Glu Val Leu Val Asp Gly Trp Phe Arg Thr
 370 375 380
 Gly Asp Met Gly Val Gln Asp Glu Asp Gly Tyr Leu Ser Ile Val Asp
 385 390 395 400
 Arg Lys Lys Asp Met Ile Val Arg Gly Gly Tyr Asn Val Tyr Pro Arg
 405 410 415
 Glu Val Glu Asp Val Leu Leu Arg His Pro Ala Val Asp Gly Ala Cys
 420 425 430
 Val Val Gly Val Pro Ser Val Lys His Gly Glu Glu Val Cys Ala Val
 435 440 445
 Val Arg Val Lys Pro Gly Gln Arg Ala Ser Gly Leu Leu Ala Glu Glu
 450 455 460
 Ile Val Ala Trp Ser Arg Val His Met Ala Ala Tyr Lys Tyr Pro Arg
 465 470 475 480
 Arg Val Glu Phe Val Glu Thr Phe Pro Leu Gly Ser Ser Gly Lys Val
 485 490 495
 Leu Lys Arg Glu Leu Ala His Arg Tyr Ala
 500 505

<210> 74
 <211> 1521
 <212> DNA
 <213> Streptomyces aizunensis

<400> 74
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gccctggtgt gcggggcgga gcggatctcg tacgcgcgtc tgtgggaccg ggcccgccgg 120
tacgccgccg ccctgcgcgg ccagggcacg ggccccgacg acaaggtcgc gctgctgatg 180
ccgaacaccc cggagttcgc ggcggtgtac ttcgcggtgc tcgcgctcgg cgccgtcgtc 240
gtccccgtcc acaccctgct gaagcccgcg gaggtctcgc atctcctccg ggactcggga 300
gcgcggggccc tcgtatgggc cgggacgctc ccgcaggaga ccgcacggga cgccggggag 360
accgggggtcc tgetcctgac cgtgggggag gccctgcacg gctccgtcct cctcgacgac 420
ggcgctcgagc ccatcgacac gtatgtcgag cggggggcgg acgacctcgc gctggtgctg 480
tacacctccg gtacgacggg caggccgaag ggggcgatgc tcacgcacgg caacgtcgcg 540
acgaacatcg ccgtgaccgc cgtgtccccc ttcgccttcg gcgaggacga cgtgctgctc 600
ggcgcgctgc cgctgtcgca caccttcggc cagatctgcg ggatggccgt caccttcac 660
gcgggcgcga cgctggtggt catggagcgc ttcgaggcgc acgacgccct gcggctgatg 720
cgcgagcacg gctgcacggt cttcatgggc gtgccgacca tgtaccacgc gctgctcgaa 780
gcggtcgcgg ccggcgcccc ggcgccgcgc ctcacccgcg tgtacagcgg tgggtcggct 840
ctgccggtgc cgggtgctga ccgggtgcgg gcggcggttcg gctgcgaggt gtacaggggg 900
tacgggctca ccgagacctc gccctgcgtg gcgtacaacc agccgggcat ccctgcaag 960
ccgggcacgg tggggctgcc catcgacggc gtacgggtcg ccatcgccga cgcgagctg 1020
gaaggacgca tcaggctgct gaagcagggc gacatcggcg agatcgtcgt gagcggacac 1080
aacgtgatgg cgggctacct cggccggccg caggagaccg ccgaggtact ggtcgacggc 1140
tggttccgga ccggggacat gggcgtgcag gacgaggacg gctatctgtc catcgtcgac 1200
cggaagaagg acatgatcgt ccgcggtggc tacaacgtct acccccgcga ggtggaggac 1260
gtactgctgc gccatccgc cgtggacggc gcctgcgtgg tcggcgtgcc gagcgtgaag 1320
cacggcgagg aggtgtgcgc cgtggtccgg gtgaagcccg gtcagcgcgc gagcggcttc 1380
ctcgcggagg agatcgtggc ctggagccgg gtgcacatgg cggcctacaa gtacccgcgc 1440
cgcgtcgagt tcgtggagac cttcccgtg ggatcgagcg gcaaggctct caagcgggag 1500
ctggcacacc gctacgctg a 1521

<210> 75
<211> 217
<212> PRT
<213> Streptomyces aizunensis

<400> 75

Val Pro Thr Arg Thr Val Glu Glu Asp Ile Glu Ile Val Leu Ile Val
 1 5 10 15
 Arg Asp Asp Met Arg Arg Tyr Gly Val Glu Gly Met Cys Arg Ser Leu
 20 25 30
 Asp Thr Pro Val Glu Ala Gln Ser Tyr Ala Asp Phe Asp Asp Leu Asp
 35 40 45
 Pro Phe Ser Gly Gly Gln Leu Val Ile Leu Ser Ser Asp Ala Ala Gly
 50 55 60
 Pro Leu Ser Ala Glu Thr Ala Glu Ser Leu Arg Thr His Glu Ile Pro
 65 70 75 80
 Val Leu Ile Leu Val Asp Ser Ala Ala Pro Val Glu Gln Ser Trp Ala
 85 90 95
 Asp Gln Ala Arg Gly Phe Leu Asp Trp Ala Asp Leu Arg Pro Asp Thr
 100 105 110
 Leu Arg Asp Ala Ile Ala Asp Val Ala Ala Gly Arg Phe Phe Ala Ser
 115 120 125
 Glu Thr Leu Ala Arg Arg Ser Val Thr Ala Ala Glu Gln Thr Glu Gly
 130 135 140
 Gly Thr Pro Ala Ala Arg Ser Pro Ile Thr Leu Thr Ala Arg Glu Leu
 145 150 155 160
 Gln Val Leu Arg Leu Ile Ala Gly Gly Leu Ser Asn Arg Gln Ile Ala
 165 170 175
 Arg Ser Leu Asn Ile Ser Glu His Gly Val Lys Arg Leu Val Gly Ile
 180 185 190
 Val Leu Ala Lys Leu Asn Cys Pro Asn Arg Thr Leu Ala Val Val Arg
 195 200 205
 Ala Ile Asp Ala Gly Leu Leu Thr Leu
 210 215

<210> 76

<211> 654

<212> DNA

<213> Streptomyces aizunensis

<400> 76

gtgccgaccc gcactgttga ggaagacatc gagatagtcc tgatcgtccg cgacgacatg 60
 cggcgctatg gcgtcgaggg aatgtgccgt tgcgtggaca cccccgtcga ggcgcagtcc 120
 tacgcggtatt tcgatgatct cgacccttc tccggaggcc agttggtcat cctctccagt 180
 gatgcgggcg gtccctctc cgccgagacc gccgaaagcc tgcggacgca tgagataccc 240
 gtgctgatcc tggtcgactc ggccgccccg gtcgagcagt cctgggcccga ccaggcgcg 300
 ggcttcctgg actgggcgga tctgcgcccc gacaccttgc gcgacgcgat cgccgatgtg 360

gcggccgggc gcttcttcgc gtcggagacc ttggcgcggc gctccgtgac ggcggcggag 420
cagacggagg gcggaacgcc cgcggcgcgg agcccgatca cgctgacggc gcgtgaactc 480
caggtcctgc gcctgatcgc gggcggctctg agcaatcggc agatcgcgcg gtcgctgaac 540
atctccgagc acggtgtcaa acgcttggtc gggatcgtcc tggccaagct caactgtccg 600
aaccgcacgc tcgccgtggt ccgtgccatt gacgcgggtc tcctcacctt gtga 654

<210> 77
<211> 442
<212> PRT
<213> Streptomyces aizunensis

<400> 77

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Thr | Lys | Asn | Gln | Glu | Pro | Arg | Asp | Pro | Ser | Gly | Thr | Arg | Pro | Arg | 1 | 5 | 10 | 15 |
| Lys | Ala | Ala | Ala | Ser | Gly | Lys | Pro | Ser | Leu | His | His | Ala | Val | Pro | Pro | 20 | 25 | 30 | |
| Thr | Gly | Pro | Gly | Gly | Pro | Pro | Ala | Ala | Ala | Asp | Ser | Gln | Ile | Thr | Leu | 35 | 40 | 45 | |
| Arg | Ser | Pro | Ala | Glu | Leu | Ala | Asp | Ala | Leu | Pro | Tyr | Met | Leu | Gly | Phe | 50 | 55 | 60 | |
| His | Pro | Thr | Asp | Ser | Leu | Val | Met | Val | Ala | Leu | His | Gly | Glu | Gly | Gly | 65 | 70 | 75 | 80 |
| Arg | Phe | Gly | Gly | Arg | Leu | Arg | Val | Gly | Ile | Pro | Thr | Asp | Arg | Gly | Glu | 85 | 90 | 95 | |
| Trp | Glu | Asp | Thr | Ala | Arg | Gln | Val | Ala | Asp | Cys | Leu | Val | His | Gly | Ser | 100 | 105 | 110 | |
| Glu | Arg | Arg | Gly | Gly | Lys | Pro | Asp | Gly | Ile | Val | Val | Phe | Leu | Cys | Gln | 115 | 120 | 125 | |
| Asp | Pro | Arg | Gly | Gly | Glu | Ser | Gly | Gln | Arg | Val | Met | Thr | Arg | Leu | Arg | 130 | 135 | 140 | |
| Pro | Leu | Ala | Gln | Arg | Ile | Arg | Leu | Ala | Cys | Gly | Ala | Leu | Asp | Val | Pro | 145 | 150 | 155 | 160 |
| Val | Leu | Glu | Ala | Leu | Cys | Leu | Ser | Gly | Gly | Arg | Tyr | Trp | Ser | Tyr | Cys | 165 | 170 | 175 | |
| Cys | Pro | Asp | Ala | Arg | Cys | Cys | Pro | Ala | Glu | Gly | Thr | Ala | Leu | Thr | Val | 180 | 185 | 190 | |
| Pro | Gly | Thr | Ser | Val | Met | Ala | Ala | Ala | Ala | Thr | Tyr | Ala | Gly | Leu | Arg | 195 | 200 | 205 | |
| Val | Arg | Gly | Ser | Leu | Gln | Glu | Ile | Glu | Gly | Arg | Leu | Ala | Pro | Leu | Arg | 210 | 215 | 220 | |

Gly Pro Leu Ala Asp Glu Gln Glu Arg Ser Leu Asp Leu Ala Ala Thr
 225 230 235 240
 Ala Leu Val Pro Lys Ile Leu Asp Gly Ala Thr Arg Glu Asp Val Gly
 245 250 255
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